Operating Instructions

Pressure transmitter with ceramic measuring cell

VEGABAR 82

Profibus PA

Document ID: 45031

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Safety instructions for Ex areas

Please note the Ex-specific safety information for installation and operation in Ex areas. These safety instructions are part of the operating instructions manual and come with the Ex-approved instruments.

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1 About this document

1.1 Function

This operating instructions manual provides all the information you need for mounting, connection and setup as well as important instructions for maintenance and fault rectification. Please read this information before putting the instrument into operation and keep this manual accessible in the immediate vicinity of the device.

1.2 Target group

This operating instructions manual is directed to trained specialist personnel. The contents of this manual should be made available to these personnel and put into practice by them.

1.3 Symbolism used

Information, tip, note
This symbol indicates helpful additional information.

Caution: If this warning is ignored, faults or malfunctions can result.

Warning: If this warning is ignored, injury to persons and/or serious damage to the instrument can result.

Danger: If this warning is ignored, serious injury to persons and/or destruction of the instrument can result.

Ex applications
This symbol indicates special instructions for Ex applications.

- **List**
  The dot set in front indicates a list with no implied sequence.

→ **Action**
This arrow indicates a single action.

1 **Sequence of actions**
Numbers set in front indicate successive steps in a procedure.

Battery disposal
This symbol indicates special information about the disposal of batteries and accumulators.

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2 For your safety

2.1 Authorised personnel

All operations described in this operating instructions manual must be carried out only by trained specialist personnel authorised by the plant operator.

During work on and with the device the required personal protective equipment must always be worn.

2.2 Appropriate use

The VEGABAR 82 is a pressure transmitter for process pressure and hydrostatic level measurement.

You can find detailed information on the application range in chapter "*Product description*".

Operational reliability is ensured only if the instrument is properly used according to the specifications in the operating instructions manual as well as possible supplementary instructions.

2.3 Warning about incorrect use

Inappropriate or incorrect use of the instrument can give rise to application-specific hazards, e.g. vessel overfill or damage to system components through incorrect mounting or adjustment.

2.4 General safety instructions

This is a high-tech instrument requiring the strict observance of standard regulations and guidelines. The user must take note of the safety instructions in this operating instructions manual, the country-specific installation standards as well as all prevailing safety regulations and accident prevention rules.

The instrument must only be operated in a technically flawless and reliable condition. The operator is responsible for trouble-free operation of the instrument.

During the entire duration of use, the user is obliged to determine the compliance of the necessary occupational safety measures with the current valid rules and regulations and also take note of new regulations.

2.5 CE conformity

The device fulfills the legal requirements of the applicable EC guidelines. By affixing the CE marking, we confirm successful testing of the product.

You can find the CE Certificate of Conformity in the download section of our homepage.

Electromagnetic compatibility

Instruments with plastic housing as well as in four-wire or Ex-d-ia version are designed for use in an industrial environment. Nevertheless, electromagnetic interference from electrical conductors and

radiated emissions must be taken into account, as is usual with a class A instrument according to EN 61326-1. If the instrument is used in a different environment, the electromagnetic compatibility to other instruments must be ensured by suitable measures.

2.6 Measuring range - permissible process pressure

The permissible process pressure is specified on the type label with "process pressure", see chapter "*Configuration*". For safety reasons, this range must not be exceeded. This applies also if a measuring cell with higher measuring range (order-related) than the permissible pressure range of the process fitting is installed.

2.7 NAMUR recommendations

NAMUR is the automation technology user association in the process industry in Germany. The published NAMUR recommendations are accepted as the standard in field instrumentation.

The device fulfills the requirements of the following NAMUR recommendations:

- NE 21 – Electromagnetic compatibility of equipment
- NE 43 – Signal level for malfunction information from measuring transducers
- NE 53 – Compatibility of field devices and display/adjustment components
- NE 107 – Self-monitoring and diagnosis of field devices

For further information see www.namur.de.

2.8 Environmental instructions

Protection of the environment is one of our most important duties. That is why we have introduced an environment management system with the goal of continuously improving company environmental protection. The environment management system is certified according to DIN EN ISO 14001.

Please help us fulfill this obligation by observing the environmental instructions in this manual:

- Chapter "*Packaging, transport and storage*"
- Chapter "*Disposal*"

3 Product description

3.1 Configuration

Type plate

The nameplate contains the most important data for identification and use of the instrument:

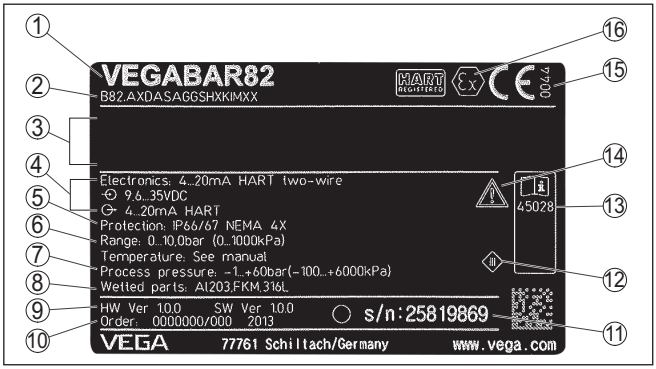

Fig. 1: Layout of the type label (example)

1 *Instrument type*
2 *Product code*
3 *Field for approvals*
4 *Power supply and signal output, electronics*
5 *Protection rating*
6 *Measuring range*
7 *Permissible process pressure*
8 *Material, wetted parts*
9 *Hardware and software version*
10 *Order number*
11 *Serial number of the instrument*
12 *Symbol of the device protection class*
13 *ID numbers, instrument documentation*
14 *Reminder to observe the instrument documentation*
15 *Notified authority for CE marking*
16 *Approval directive*

Serial number

The type label contains the serial number of the instrument. With it you can find the following data on our homepage:

- Product code of the instrument (HTML)
- Delivery date (HTML)
- Order-specific instrument features (HTML)
- Operating instructions at the time of shipment (PDF)
- Order-specific sensor data for an electronics exchange (XML)
- Test certificate pressure transmitters (PDF)

Go to www.vega.com, "*VEGA Tools*" and "*Serial number search*".

As an alternative, you can find the data via your Smartphone:

- Download the smartphone app "*VEGA Tools*" from the "*Apple App Store*" or the "*Google Play Store*"
- Scan the Data Matrix code on the type label of the instrument or
- Enter the serial number manually in the app

Scope of this operating instructions manual

This operating instructions manual applies to the following instrument versions:

- Hardware from 1.0.0
- Software version from 1.0.0

Scope of delivery

The scope of delivery encompasses:

- Pressure transmitter
- Documentation
  - this operating instructions manual
  - Test certificate, pressure transmitters
  - Operating instructions manual "*Display and adjustment module*" (optional)
  - Supplementary instructions "*GSM/GPRS radio module*" (optional)
  - Supplementary instructions manual "*Heating for display and adjustment module*" (optional)
  - Supplementary instructions manual "*Plug connector for continuously measuring sensors*" (optional)
  - Ex-specific "*Safety instructions*" (with Ex versions)
  - if necessary, further certificates

3.2 Principle of operation

Measured variables

The VEGABAR 82 is suitable for the measurement of the following process variables:

- Process pressure
- Level

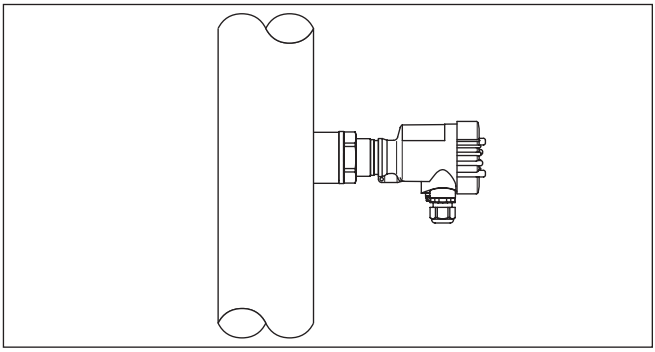

Fig. 2: Process pressure measurement VEGABAR 82

Electronic differential pressure

In combination with a slave sensor, VEGABAR 82 is also suitable for electronic differential pressure measurement.

You can find detailed information in the operating instructions of the respective slave sensor.

Application area

VEGABAR 82 is suitable for applications in virtually all industries. It is used for the measurement of the following pressure types.

- Gauge pressure
- Absolute pressure
- Vacuum

Measured products

Measured products are gases, vapours and liquids.

Depending on the process fitting and measurement setup, measured products can be also viscous or contain abrasive substances.

Measuring system

Sensor element is the CERTEC® measuring cell with robust ceramic diaphragm. The process pressure deflects the ceramic diaphragm and causes a capacitance change in the measuring cell. This capacitance change is converted into an electrical signal and outputted as measured value via the output signal.

The CERTEC® measuring cell is available in two sizes:

- ø 17.5 mm with small process fittings and pressure measuring range 100 bar
- ø 28 mm with large process fittings as well as all flange connections

The CERTEC® measuring cell has also an integrated temperature sensor. The temperature value is outputted through:

- The display and adjustment module
- The current output
- The digital signal output

Pressure types

The measuring cell design depends on the selected pressure type.

Relative pressure: the measuring cell is open to atmosphere. The ambient pressure is detected in the measuring cell and compensated. It thus has no influence on the measured value.

Absolute pressure: the measuring cell is evacuated and encapsulated. The ambient pressure is not compensated and does hence influence the measured value.

Relative pressure, climate-compensated: the measuring cell is evacuated and encapsulated. The ambient pressure is detected through a reference sensor in the electronics and compensated. It thus has no influence on the measured value.

Seal concepts

The following presentations show the installation of the CERTEC® measuring cell into the process fitting and the different seal concepts.

Recessed installation

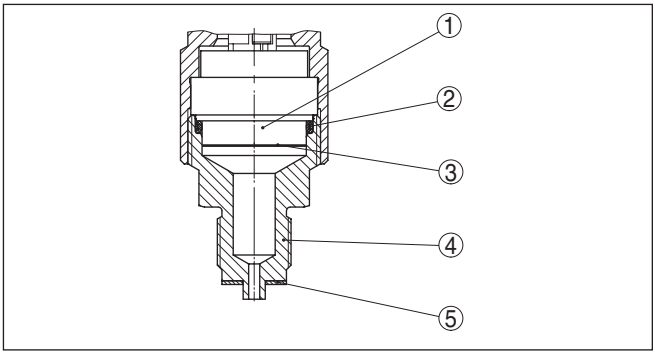

Fig. 3: Recessed installation of the CERTEC® measuring cell

1 Measuring cell
2 Seal for the measuring cell
3 Diaphragm
4 Process fitting
5 Seal for the process fitting

Front-flush mounting with single seal

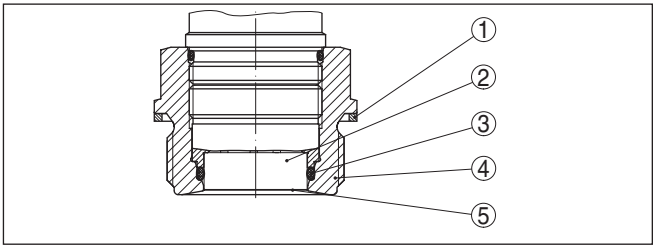

Fig. 4: Front-flish mounting of the CERTEC® measuring cell

1 Seal for the process fitting
2 Measuring cell
3 Seal for the measuring cell
4 Process fitting
5 Diaphragm

Front-flush mounting with double seal

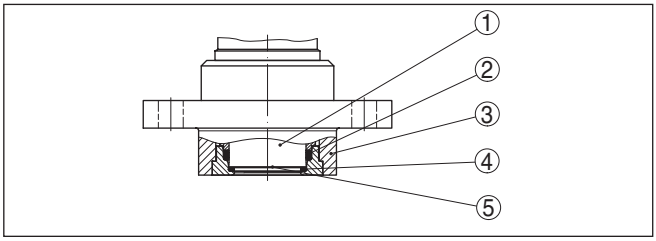

Fig. 5: Front-flush installation of the CERTEC® measuring cell with double seal

1 *Measuring cell*
2 *Seal for the measuring cell*
3 *Process fitting*
4 *Additional, front seal for measuring cell*
5 *Diaphragm*

Installation in hygienic fitting

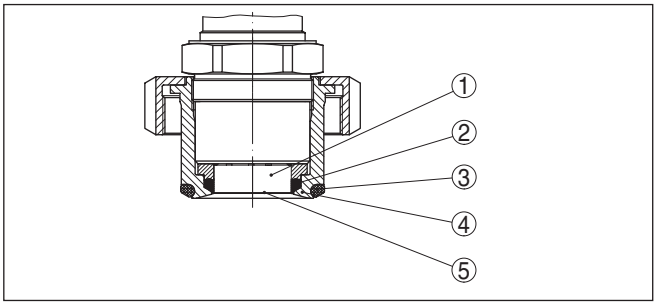

Fig. 6: Hygienic installation of the CERTEC® measuring cell

1 *Measuring cell*
2 *Form seal for the measuring cell*
3 *Gap-free seal for process fitting*
4 *Process fitting*
5 *Diaphragm*

3.3 Packaging, transport and storage

Packaging

Your instrument was protected by packaging during transport. Its capacity to handle normal loads during transport is assured by a test based on ISO 4180.

The packaging of standard instruments consists of environment-friendly, recyclable cardboard. For special versions, PE foam or PE foil is also used. Dispose of the packaging material via specialised recycling companies.

Transport

Transport must be carried out in due consideration of the notes on the transport packaging. Nonobservance of these instructions can cause damage to the device.

Transport inspection

The delivery must be checked for completeness and possible transit damage immediately at receipt. Ascertained transit damage or concealed defects must be appropriately dealt with.

Storage

Up to the time of installation, the packages must be left closed and stored according to the orientation and storage markings on the outside.

Unless otherwise indicated, the packages must be stored only under the following conditions:

- Not in the open
- Dry and dust free
- Not exposed to corrosive media
- Protected against solar radiation
- Avoiding mechanical shock and vibration

Storage and transport temperature

- Storage and transport temperature see chapter "*Supplement - Technical data - Ambient conditions*"
- Relative humidity 20 … 85 %

3.4 Accessories and replacement parts

PLICSCOM

The display and adjustment module PLICSCOM is used for measured value indication, adjustment and diagnosis. It can be inserted into the sensor or the external display and adjustment unit and removed at any time.

You can find further information in the operating instructions "*Display and adjustment module PLICSCOM*" (Document-ID 27835).

VEGACONNECT

The interface adapter VEGACONNECT enables the connection of communication-capable instruments to the USB interface of a PC. For parameter adjustment of these instruments, the adjustment software PACTware with VEGA-DTM is required.

You can find further information in the operating instructions "*Interface adapter VEGACONNECT*" (Document-ID 32628).

Slave sensors

Slave sensors of VEGABAR series 80 enable in conjunction with VEGABAR 82 an electronic differential pressure measurement.

You can find further information in the operating instructions of the respective slave sensor.

VEGADIS 81

The VEGADIS 81 is an external display and adjustment unit for VEGA plics® sensors.

For sensors with double chamber housing the interface adapter "*DIS-ADAPT*" is also required for VEGADIS 81.

You can find further information in the operating instructions "*VEGADIS 81*" (Document-ID 43814).

DIS-ADAPT

The adapter "*DIS-ADAPT*" is an accessory part for sensors with double chamber housings. It enables the connection of VEGADIS 81 to the sensor housing via an M12 x 1 plug.

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You can find further information in the supplementary instructions "*Adapter DISADAPT*" (Document-ID 45250).

Protective cap

The protective cover protects the sensor housing against soiling and intense heat from solar radiation.

You will find additional information in the supplementary instructions manual "*Protective cover*" (Document-ID 34296).

Flanges

Screwed flanges are available in different versions according to the following standards: DIN 2501, EN 1092-1, BS 10, ANSI B 16.5, JIS B 2210-1984, GOST 12821-80.

You can find additional information in the supplementary instructions manual "*Flanges according to DIN-EN-ASME-JIS*" (Document-ID 31088).

Welded socket

Welded sockets are used to connect the sensors to the process.

You can find further information in the supplementary instructions "*Welded socket VEGABAR series 80*" (Document-ID 45082).

Electronics module

The electronics module VEGABAR series 80 is a replacement part for pressure transmitters of VEGABAR series 80. There is a different version available for each type of signal output.

You can find further information in the operating instructions "*Electronics module VEGABAR series 80*" (Document-ID 45054).

Supplementary electronics Profibus PA

The supplementary is a replacement part for the following sensors with signal output Profibus PA:

- VEGAPULS series 60
- VEGAFLEX 80 series
- VEGABAR series 80

You can find further information in the operating instructions "*Supplementary electronics for Profibus PA*" (Document-ID 42767).

4 Mounting

4.1 General instructions to use the instrument

Suitability for the process conditions

Make sure that all parts of the instrument exposed to the process are suitable for the existing process conditions.

These are mainly:

- Active measuring component
- Process fitting
- Process seal

Process conditions are particularly:

- Process pressure
- Process temperature
- Chemical properties of the medium
- Abrasion and mechanical influences

You can find the specifications of the process conditions in chapter "*Technical data*" as well as on the nameplate.

Protection against moisture

Protect your instrument through the following measures against moisture penetration:

- Use the recommended cable (see chapter "*Connecting to power supply*")
- Tighten the cable gland
- Loop the connection cable downward in front of the cable gland

This applies particularly to:

- Outdoor mounting
- Installations in areas where high humidity is expected (e.g. through cleaning processes)
- Installations on cooled or heated vessels

Screwing in

On instruments with process fitting thread, the hexagon must be tightened with a suitable screwdriver. Wrench size see chapter "*Dimensions*".

Warning:
The housing must not be used to screw the instrument in! Applying tightening force can damage internal parts of the housing.

Vibrations

In case of strong vibrations at the mounting location, the instrument version with external housing should be used. See chapter "*External housing*".

Temperature limits

Higher process temperatures often mean also higher ambient temperatures. Make sure that the upper temperature limits stated in chapter "*Technical data*" for the environment of the electronics housing and connection cable are not exceeded.

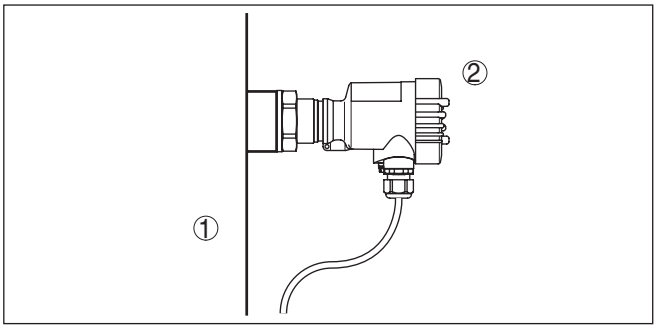

Fig. 7: Temperature ranges

1 Process temperature
2 Ambient temperature

4.2 Ventilation and pressure compensation

Filter elements

Ventilation and pressure compensation are carried out with VEGABAR 82 via a filter element. It is air permeable and moisture-blocking.

Caution:
The filter element causes a time-delayed pressure compensation. When quickly opening/closing the housing cover, the measured value can change for approx. 5 s by up to 15 mbar.

For effective ventilation, the filter element must always be free of buildup.

Caution:
Do not use a high-pressure cleaner. The filter element could be damaged, which would allow moisture into the housing.

The following paragraphs describe how the filter element is arranged in the different instrument versions.

Instruments in non-Ex and Ex-ia version

The filter element is mounted into the electronics housing. It has the following functions:

- Ventilation electronics housing
- Atmospheric pressure compensation (with relative pressure measuring ranges)

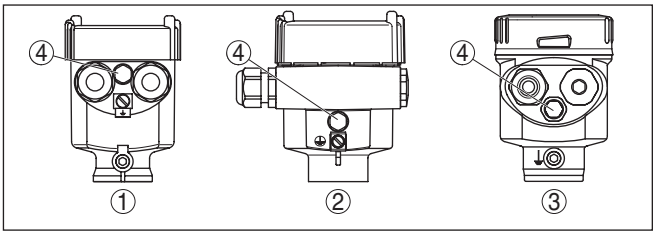

Fig. 8: Position of the filter element - non-Ex, Ex-ia version

1 Housing plastic, stainless steel precision casting
2 Housing aluminium
3 Housing stainless steel, electropolished
4 Filter element

With the following instruments a blind plug is installed instead of the filter element:

- Instruments in protection IP 66/IP 68 (1 bar) - ventilation via capillaries in fix connected cable
- Instruments with absolut pressure

Instruments in Ex-d version

The filter element is integrated in the process assembly. It is located in a rotatable metal ring and has the following function:

- Atmospheric pressure compensation (with relative pressure measuring ranges)

Turn the metal ring in such a way that the filter element points downward after installtion of the instrument. This provides better protection against buildup.

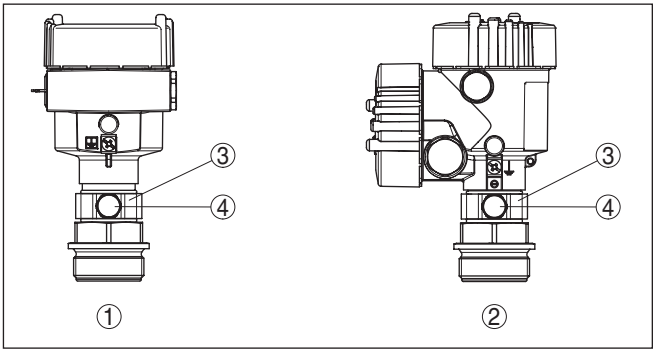

Fig. 9: Position of the filter element - Ex-d version

1 Single chamber housing, aluminium, stainless steel precision casting
2 Double chamber housing, aluminium, stainless steel precision casting
3 Rotatable metal ring
4 Filter element

Instruments with absolute pressure have a blind plug mounted instead of the filter element.

Instruments with Second Line of Defense

The filter element is mounted into the electronics housing. It has the following functions:

- Ventilation electronics housing
- Atmospheric pressure compensation (with relative pressure measuring ranges)

The process assembly of instruments with Second Line of Defense (gastight leadthrough) is completely encapsulated. An absolute pressure measuring cell is used so that no ventilation is required.

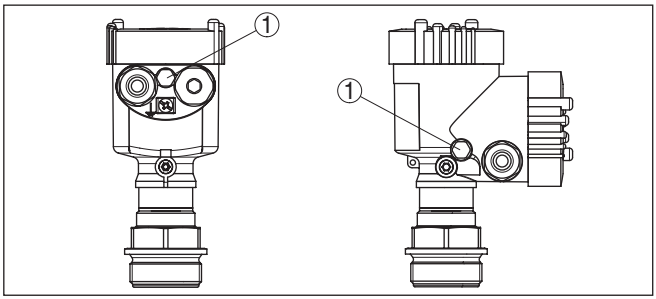

Fig. 10: Position of the filter element - gastight leadthrough

1 Filter element

With relative pressure measuring ranges, the ambient pressure is detected and compensated by a reference sensor in the electronics.

Instruments in IP 69K version

The filter element is mounted into the electronics housing. It has the following functions:

- Ventilation electronics housing
- Atmospheric pressure compensation (with relative pressure measuring ranges)

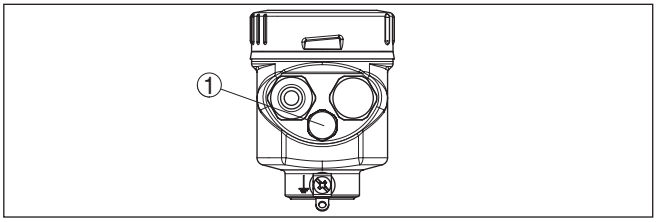

Fig. 11: Position of the filter element - IP 69K version

1 Filter element

Instruments with absolute pressure have a blind plug mounted instead of the filter element.

4.3 Process pressure measurement

Measurement setup in gases

Keep the following in mind when setting up the measuring system:

- Mount the instrument above the measuring point

Possible condensation can then drain off into the process line.

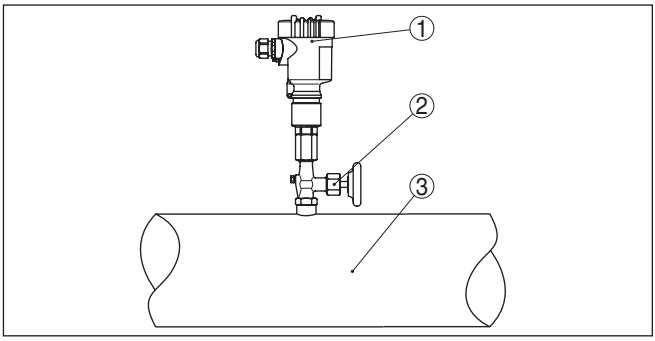

Fig. 12: Measurement setup for process pressure measurement of gases in pipelines

1 VEGABAR 82
2 Blocking valve
3 Pipeline

Measurement setup in vapours

Keep the following in mind when setting up the measuring system:

- Connect via a siphon
- Do not insulate the siphon
- Fill the siphon with water before setup

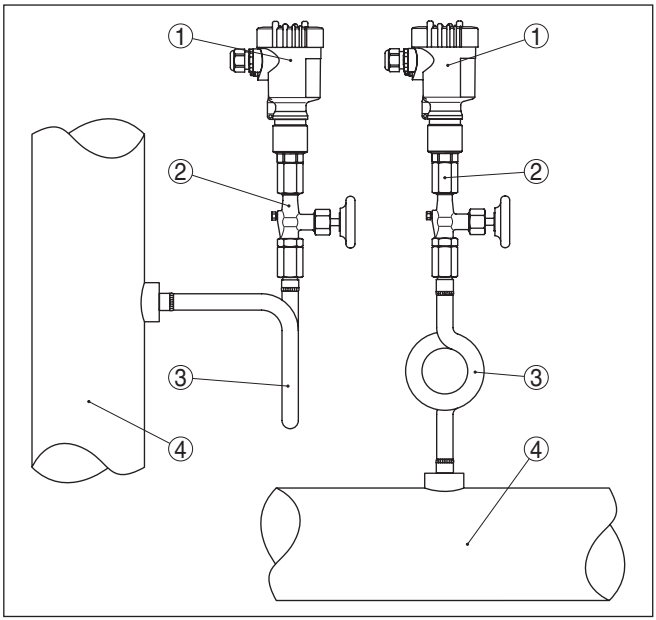

Fig. 13: Measurement setup with process pressure measurement of gases in pipelines

1 VEGABAR 82
2 Blocking valve
3 Siphon
4 Pipeline

A protective accumulation of water is formed through condensation in the pipe bends. Even in applications with hot steam, a medium temperature < 100 °C on the transmitter is ensured.

Measurement setup in liquids

Keep the following in mind when setting up the measuring system:

- Mount the instrument below the measuring point

The effective pressure line is always filled with liquid and gas bubbles can bubble up to the process line.

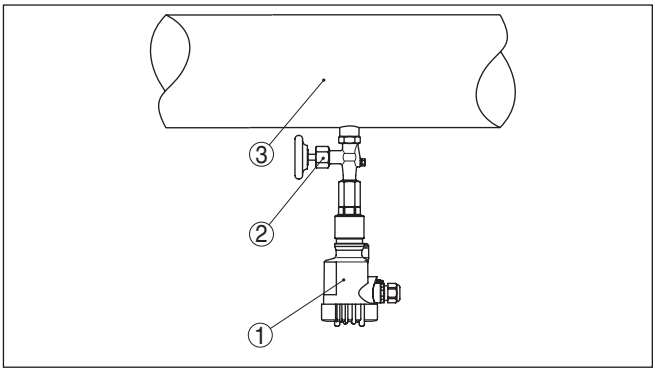

Fig. 14: Measurement setup for process pressure measurement of liquids in pipelines

1 VEGABAR 82
2 Blocking valve
3 Pipeline

4.4 Level measurement

Measurement setup

Keep the following in mind when setting up the measuring system:

- Mount the instrument below the min. level
- Do not mount the instrument close to the filling stream or emptying area
- Mount the instrument so that it is protected against pressure shocks from the stirrer

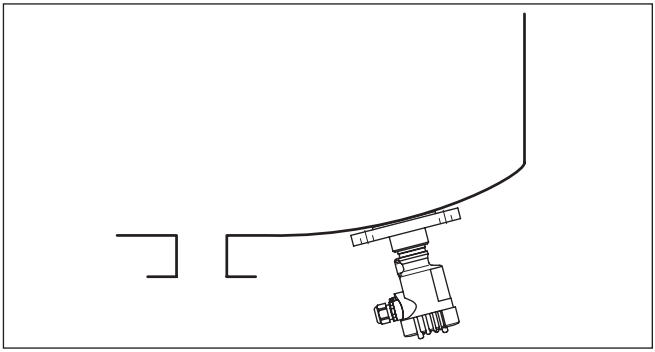

Fig. 15: Measurement setup for level measurement

4.5 External housing

Configuration

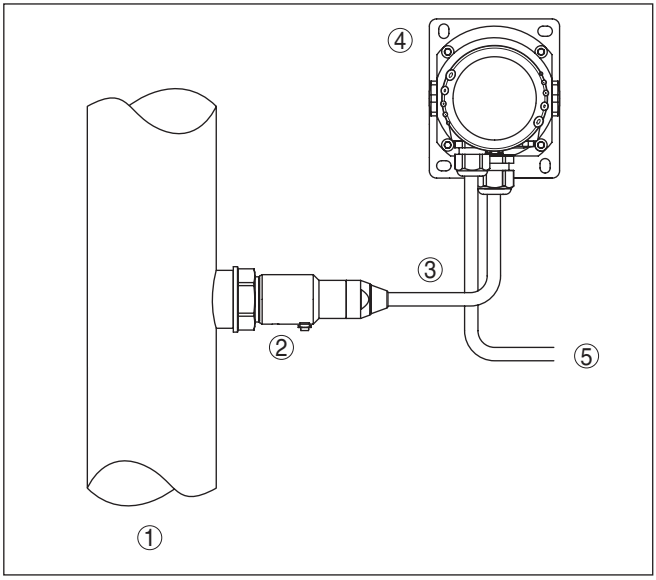

Fig. 16: Setup process assembly, external housing

1 Process assembly
2 Connection cable process assembly - External housing
3 External housing
4 Signal cable

Mounting

1. Mark the holes according to the following drilling template
2. Fasten wall mounting plate with 4 screws

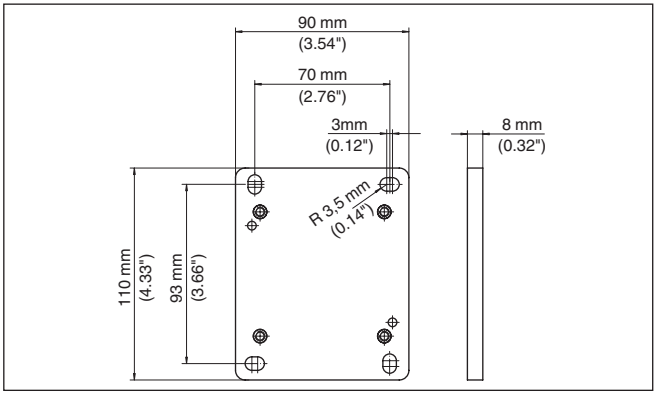

Fig. 17: Drilling template - wall mounting plate

5 Connecting to power supply

5.1 Preparing the connection

Safety instructions

Always keep in mind the following safety instructions:

- Connect only in the complete absence of line voltage
- If overvoltage surges are expected, overvoltage arresters should be installed

Voltage supply

The voltage supply is provided by a Profibus DP /PA segment coupler.

The voltage supply range can differ depending on the instrument version. You can find the data for voltage supply in chapter "*Technical data*".

Connection cable

Connection is made with screened cable according to the Profibus specification. Power supply and digital bus signal are carried over the same two-wire connection cable.

Use cable with round cross-section. A cable outer diameter of 5 … 9 mm (0.2 … 0.35 in) ensures the seal effect of the cable gland. If you are using cable with a different diameter or cross-section, exchange the seal or use a suitable cable gland.

Please make sure that your installation is carried out according to the Profibus specification. In particular, make sure that the termination of the bus is done with appropriate terminating resistors.

You can find detailed information of the cable specification, installation and topology in the "*Profibus PA - User and Installation Guideline*" on www.profibus.com.

Cable gland ½ NPT

With plastic housing, the NPT cable gland or the Conduit steel tube must be screwed without grease into the threaded insert.

Max. torque for all housings see chapter "*Technical data*".

Cable screening and grounding

Make sure that the cable screening and ground is executed according to the Fielbus specification. If electromagnetic interference is expected which is above the test values of EN 61326-1 for industrial areas, we recommend to connect the cable screen on both ends to ground potential.

With systems with potential equalisation, connect the cable screen directly to ground potential at the power supply unit, in the connection box and at the sensor. The screen in the sensor must be connected directly to the internal ground terminal. The ground terminal outside on the housing must be connected to the potential equalisation (low impedance).

In systems without potential equalisation with cable screening on both sides, connect the cable screen directly to ground potential at the power supply unit and at the sensor. In the connection box or T-distributor, the screen of the short stub to the sensor must not be connected to ground potential or to another cable screen. The cable screens to the power supply unit and to the next distributor must be connected to each other and also connected to ground potential via a

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ceramic capacitor (e.g. 1 nF, 1500 V). Low-frequency potential equalisation currents are thus suppressed, but the protective effect against high frequency interference signals remains.

5.2 Connecting

Connection technology

The voltage supply and signal output are connected via the spring-loaded terminals in the housing.

The connection to the display and adjustment module or to the interface adapter is carried out via contact pins in the housing.

Information:
The terminal block is pluggable and can be removed from the electronics. To do this, lift the terminal block with a small screwdriver and pull it out. When reinserting the terminal block, you should hear it snap in.

Connection procedure

Proceed as follows:

1. Unscrew the housing cover
2. If a display and adjustment module is installed, remove it by turning it slightly to the left.
3. Loosen compression nut of the cable entry
4. Remove approx. 10 cm (4 in) of the cable mantle, strip approx. 1 cm (0.4 in) of insulation from the ends of the individual wires
5. Insert the cable into the sensor through the cable entry

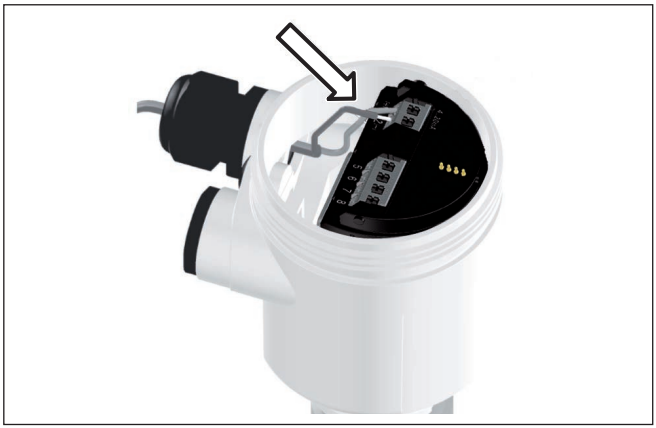


Fig. 18: Connection steps 5 and 6 - Single chamber housing

Fig. 19: Connection steps 5 and 6 - Double chamber housing

6. Insert the wire ends into the terminals according to the wiring plan

Information:
Solid cores as well as flexible cores with wire end sleeves are inserted directly into the terminal openings. In case of flexible cores without end sleeves, press the terminal from above with a small screwdriver; the terminal opening is freed. When the screwdriver is released, the terminal closes again.

You can find further information on the max. wire cross-section under "*Technical data/Electromechanical data*"

7. Check the hold of the wires in the terminals by lightly pulling on them
8. Connect the screen to the internal ground terminal, connect the outer ground terminal to potential equalisation
9. Tighten the compression nut of the cable entry. The seal ring must completely encircle the cable
10. Reinsert the display and adjustment module, if one was installed
11. Screw the housing cover back on

The electrical connection is hence finished.

5.3 Single chamber housing

The following illustration applies to the non-Ex, Ex-ia, Ex-d vand Ex-d-ia version.

Electronics and connection compartment

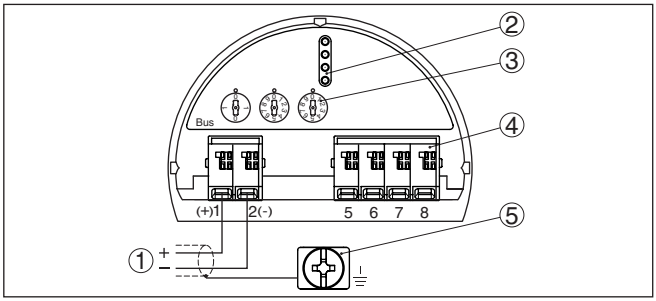


Fig. 20: Electronics and connection compartment, single chamber housing

1 Voltage supply, signal output
2 For display and adjustment module or interface adapter
3 Selection switch for bus address
4 For external display and adjustment unit
5 Ground terminal for connection of the cable screen

5.4 Double chamber housing

The following illustrations apply to the non-Ex as well as to the Ex-ia version.

Electronics compartment

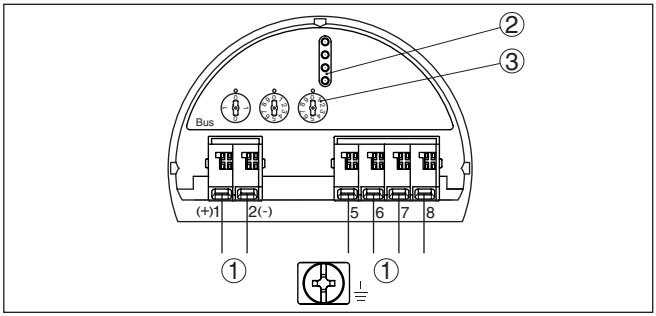


Fig. 21: Electronics compartment, double chamber housing

1 Internal connection to the connection compartment
2 Contact pins for the display and adjustment module or interface adapter
3 Selection switch for bus address

Information:
The connection of an external display and adjustment unit is not possible with this double chamber housing.

Connection compartment

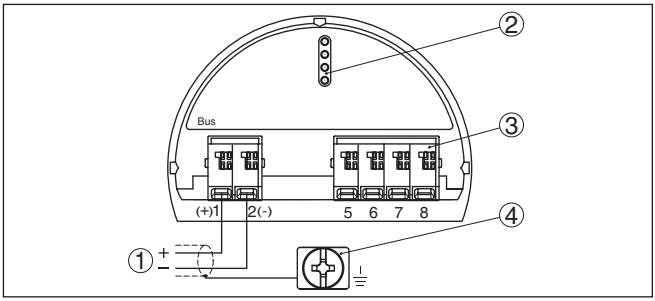


Fig. 22: Connection compartment, double chamber housing

1 Voltage supply, signal output
2 For display and adjustment module or interface adapter
3 For external display and adjustment unit
4 Ground terminal for connection of the cable screen

Information:
The use of an external display and adjustment unit and a display and adjustment module in parallel in the connection compartment is not supported.

5.5 Double chamber housing Ex d

Electronics compartment

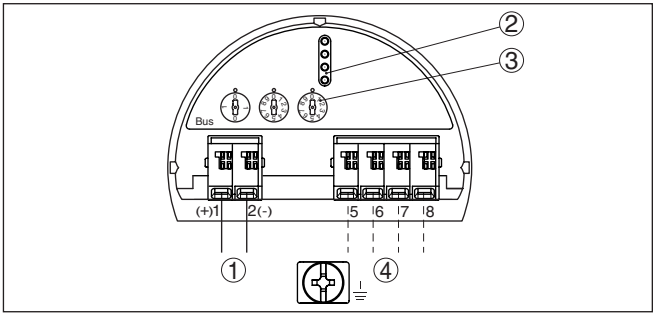


Fig. 23: Electronics compartment, double chamber housing

1 Internal connection to the connection compartment
2 Contact pins for the display and adjustment module or interface adapter
3 Selection switch for bus address
4 Internal connection to the plug connector for external display and adjustment unit (optional)

Connection compartment

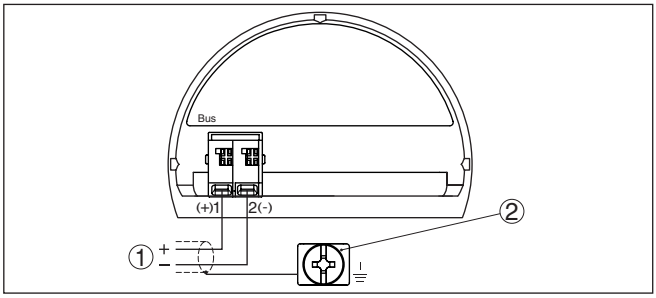


Fig. 24: Connection compartment, double chamber housing Ex d

1 Voltage supply, signal output
2 Ground terminal for connection of the cable screen

5.6 Double chamber housing with DIS-ADAPT

Electronics compartment

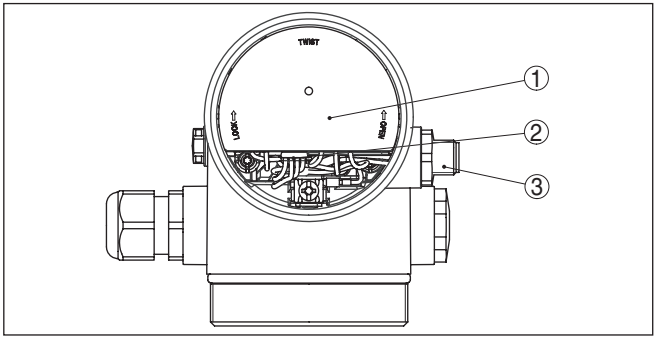


Fig. 25: View to the electronics compartment

1 DIS-ADAPT
2 Internal plug connection
3 Plug connector M12 x 1

Assignment of the plug connector

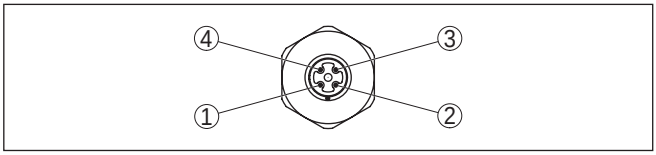


Fig. 26: Top view of the plug connector

1 Pin 1
2 Pin 2
3 Pin 3
4 Pin 4

Contact pin	Colour connection cable in the sensor	Terminal, electronics module
Pin 1	Brown	5
Pin 2	White	6
Pin 3	Blue	7
Pin 4	Black	8

5.7 Housing IP 66/IP 68 (1 bar)

Wire assignment, connection cable

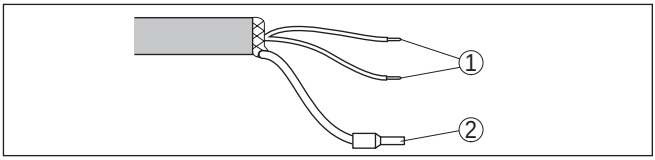


Fig. 27: Wire assignment fix-connected connection cable

1 brown (+) and blue (-) to power supply or to the processing system
2 Shielding

5.8 External housing with version IP 68 (25 bar)

Overview

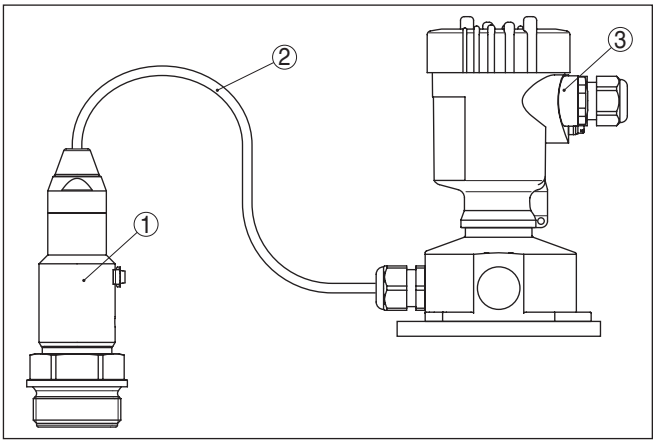


Fig. 28: VEGABAR 82 in IP 68 version 25 bar with axial cable outlet, external housing

1 Transmitter
2 Connection cable
3 External housing

Electronics and connection compartment for power supply

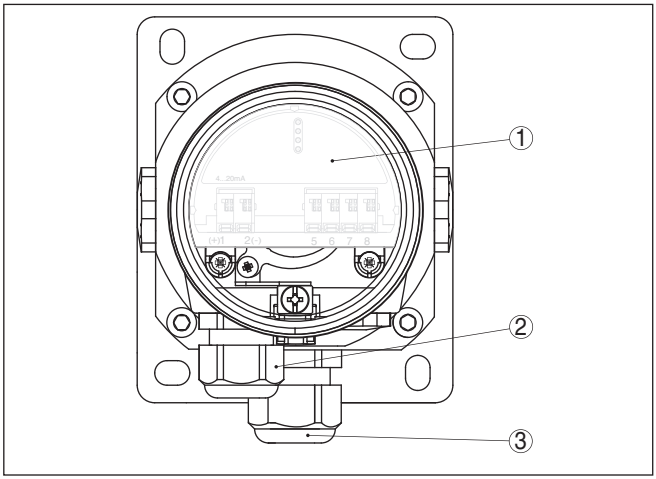


Fig. 29: Electronics and connection compartment

1 Electronics module
2 Cable gland for voltage supply
3 Cable gland for connection cable, transmitter

Terminal compartment, housing socket

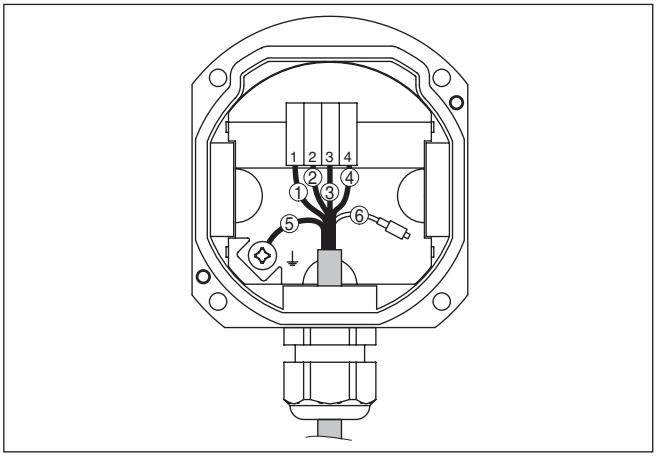


Fig. 30: Connection of the sensor in the housing base

1 Yellow
2 White
3 Red
4 Black
5 Shielding
6 Breather capillaries

Electronics and connection compartment

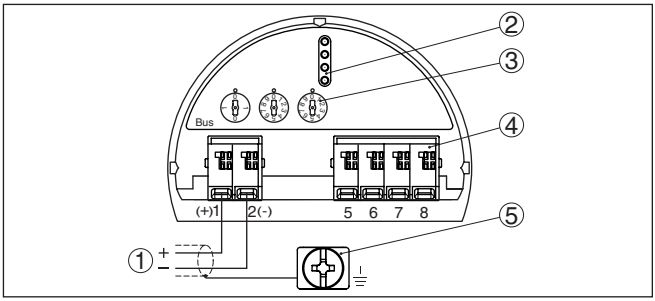


Fig. 31: Electronics and connection compartment, single chamber housing

1 Voltage supply, signal output
2 For display and adjustment module or interface adapter
3 Selection switch for bus address
4 For external display and adjustment unit
5 Ground terminal for connection of the cable screen

5.9 Switch-on phase

After connecting the instrument to power supply or after a voltage recurrence, the instrument carries out a self-check for approx. 10 s:

- Internal check of the electronics
- Indication of the instrument type, hardware and software version, measurement loop name on the display or PC
- Indication of a status message on the display or PC
- The output signal jumps to the set fault current

Then the actual measured value is outputted to the signal cable. The value takes already carried out settings, e.g. default setting into account.

6 Set up with the display and adjustment module

6.1 Insert display and adjustment module

The display and adjustment module can be inserted into the sensor and removed any time. Four positions displaced by 90° can be selected. It is not necessary to interrupt the power supply.

Proceed as follows:

1. Unscrew the housing cover
2. Place the display and adjustment module in the requested position onto the electronics and turn to the right until it snaps in
3. Screw housing cover with inspection window tightly back on

Removal is carried out in reverse order.

The display and adjustment module is powered by the sensor, an additional connection is not necessary.

Fig. 32: Insertion of the display and adjustment module with single chamber housing into the electronics compartment

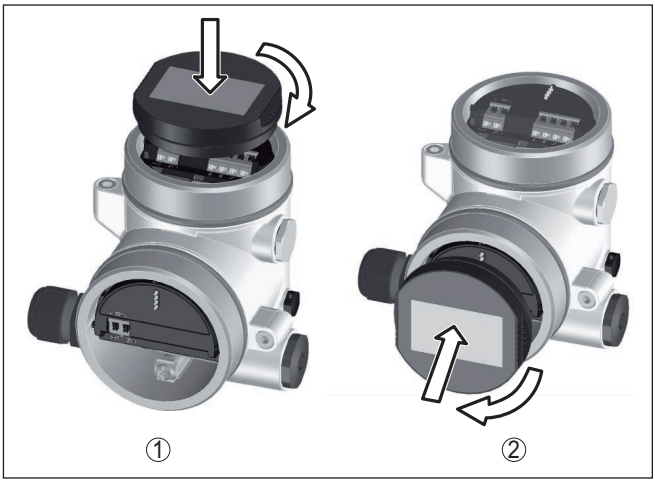


Fig. 33: Insertion of the display and adjustment module into the double chamber housing

1 In the electronics compartment
2 In the connection compartment (with Ex-d-ia version not possible)

Note:
If you intend to retrofit the instrument with a display and adjustment module for continuous measured value indication, a higher cover with an inspection glass is required.

6.2 Adjustment system

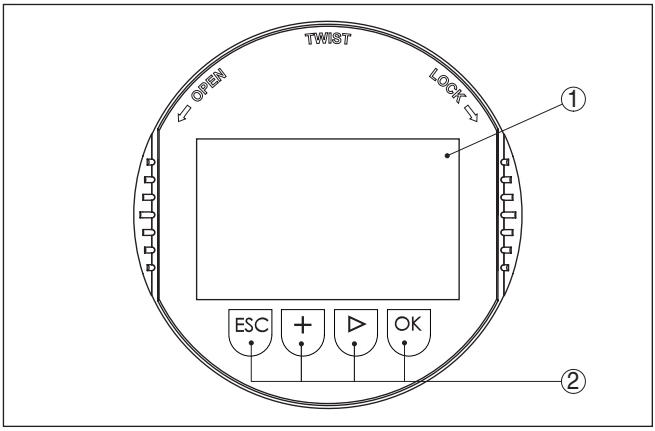


Fig. 34: Display and adjustment elements

1 LC display
2 Adjustment keys

Key functions

- ***[OK]*** key:
  – Move to the menu overview

- Confirm selected menu
- Edit parameter
- Save value

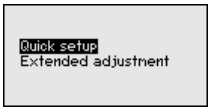
- ***[-]*** key:
  - Presentation, change measured value
  - Select list entry
  - Select editing position
- ***[+]*** key:
  - Change value of the parameter
- ***[ESC]*** key:
  - Interrupt input
  - Jump to next higher menu

Adjustment system

The device is adjusted via the four keys of the display and adjustment module. The LC display indicates the individual menu items. The functions of the individual keys are shown in the above illustration. Approx. 60 minutes after the last pressing of a key, an automatic reset to measured value indication is triggered. Any values not confirmed with ***[OK]*** will not be saved.

6.3 Parameter adjustment - Quick setup

To quickly and easily adapt the sensor to the application, select the menu item "*Quick setup*" in the start graphic on the display and adjustment module.



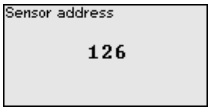
Carry out the following steps in the below sequence.

You can find "*Extended adjustment*" in the next sub-chapter.

Quick setup - Presettings

1. Sensor address

In the first menu item you have to enter a sensor address. The selection switches on the electronics module are preset to sensor address 126. This means that the sensor address can be changed via the display and adjustment module.



2. Measurement loop name

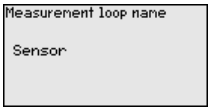
In this menu item you assign a suitable measurement loop name. Permitted are names with max. 19 characters.

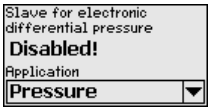
3. Application

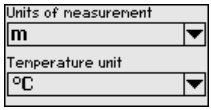
In this menu item, you activate/deactivate the slave for the electronic differential pressure and select the application. The application comprises process pressure and level measurement.

4. Units

In this menu item you determine the adjustment and temperature units of the instrument. Depending on the selected application in the menu item "*Application*", different adjustment units are available.







Quick setup - Process pressure measurement

5. Position correction

In this menu item you compensate the influence of the installation position of the instrument (offset) to the measured value.

6. zero adjustment

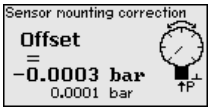
In this menu item you carry out the zero adjustment for the processs pressure.

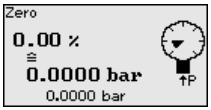
Enter the respective pressure value for 0 %.

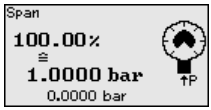
7. span adjustment

In this menu item you carry out the span adjustment for the processs pressure

Enter the respective pressure value for 100 %.







Quick setup - Level measurement

5. Position correction

In this menu item you compensate the influence of the installation position of the instrument (offset) to the measured value.

6. Max. adjustment

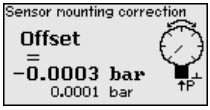
In this menu item you carry out the max. adjustment for level

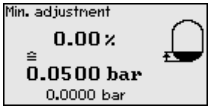
Enter the percentage value and the corresponding value for the max. level.

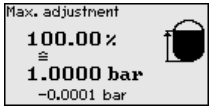
7. Min. adjustment

In this menu item you carry out the min. adjustment for level

Enter the percentage value and the corresponding value for the min. level.





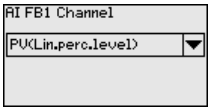


Quick setup - Function Block

8. AI FB1 Channel

In this menu item you can select the function of the first Function Block. AI stands for Analog Input.

With this you can adjust the value for the Primary Value (PV). Further settings (SV, TV) must be carried out via PACTware.



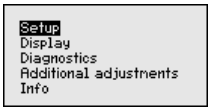
The quick setup is hence finished.

6.4 Parameter adjustment - Extended adjustment

For technically demanding measurement loops you can carry out extended settings in "*Extended adjustment*".

Main menu

The main menu is divided into five sections with the following functions:



Setup: Settings, for example, to measurement loop name, application, units, position correction, adjustment, AI FB 1 Channel - scaling - damping

Display: Settings, e.g., for language, measured value display, lighting

Diagnosis: Information, e.g. on instrument status, pointer, measurement reliability, AI FB 1 simulation

Additional adjustments: PIN, date/time, reset, copy function

Info: Instrument name, hardware and software version, date of manufacture, sensor features

In the main menu point "*Setup*", the individual submenu points should be selected subsequently and provided with the correct parameters to ensure the optimum adjustment of the measurement. The menu items are described in the following.

Setup - Instrument address

An address must be assigned to each Profibus PA instrument. Each address may only be assigned once in the Profibus PA network. The sensor is only recognized by the control system if the address is set correctly.

When the instrument is shipped, address 126 is adjusted. This address can be used for function test of the instrument and for connection to a Profibus PA network. Then address must be changed to integrate additional instruments.

The address setting is carried out either via:

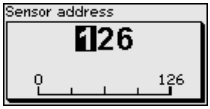
- The address selection switch in the electronics compartment of the instrument (address setting via hardware)
- The display and adjustment module (address setting via software)
- PACTware/DTM (address setting via software)

Hardware addressing

The hardware addressing is effective if an address <126 is set with the address selection switches on the electronics module of VEGABAR 82. Software addressing thus has no effect - only the set hardware address applies.

Software addressing

The software addressing is only effective if address 126 or higher is adjusted on the instrument with the address selection switches.



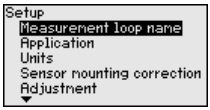
Setup - Measurement loop name

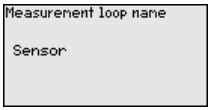
In the menu item "*Sensor TAG*" you edit a twelve digit measurement loop designation label.

You can enter an unambiguous designation for the sensor, e.g. the measurement loop name or the tank or product designation. In digital systems and in the documentation of larger plants, a singular designation must be entered for exact identification of individual measuring points.

The available digits comprise:

- Letters from A … Z
- Numbers from 0 … 9
- Special characters +, -, /, -





Setup - Application

In this menu item you activate/deactivate the slave for electronic differential pressure and select the application.

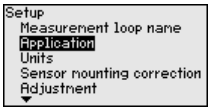
If you have connected a slave sensor, you confirm this with "*Activate*".

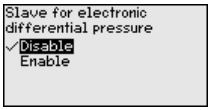
If you have connected **no** slave sensor, you confirm this with "*Deactivate*".

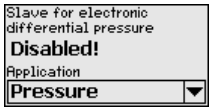
VEGABAR 82 can be used for process pressure and level measurement. Default setting is process pressure measurement. The mode can be changed in this adjustment menu.

The VEGABAR 82 in conjunction with a slave sensor can be used for flow, differential pressure, density and interface measurement. The default setting is differential pressure measurement. Switchover is carried out in the adjustment menu.

Depending on the selected application, different subchapters in the following adjustment steps are important. There you can find the individual adjustment steps.





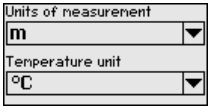


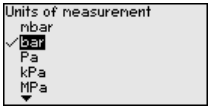
Enter the requested parameters via the appropriate keys, save your settings with ***[OK]*** and jump to the next menu item with the ***[ESC]*** and the ***[->]*** key.

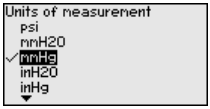
Setup - Units

In this menu item, the adjustment units of the instrument are determined. The selection determines the displayed unit in the menu items "*Min. adjustment (zero)*" and "*Max. adjustment (span)*".

Unit of measurement:



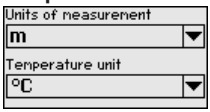


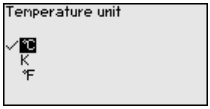


If the level should be adjusted in a height unit, the density of the medium must also be entered later during the adjustment.

In addition, the temperature unit of the instrument is specified. The selection determines the displayed unit in the menu items "*Peak value, measuring cell temperature*", "*Peak value, electronics temperature*" as well as "*HART variables*".

Temperature unit:

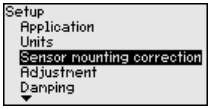


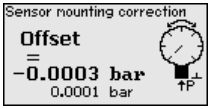


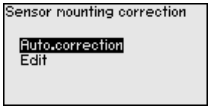
Enter the requested parameters via the appropriate keys, save your settings with ***[OK]*** and jump to the next menu item with the ***[ESC]*** and the ***[->]*** key.

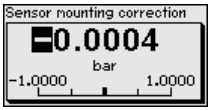
Setup - Position correction

Especially with chemical seal systems, the installation position of the instrument can shift (offset) the measured value. Position correction compensates this offset. In the process, the actual measured value is taken over automatically. With relative pressure measuring cells a manual offset can also be carried out.









If the actual measured value should be taken over as correction value during automatic position correction, this value must not be influenced by product coverage or static pressure.

With the manual position correction, the offset value can be determined by the user. Select for this purpose the function "*Edit*" and enter the requested value.

Save your settings with ***[OK]*** and move with ***[ESC]*** and ***[->]*** to the next menu item.

After the position correction is carried out, the actual measured value is corrected to 0. The corrective value appears with an inverse sign as offset value in the display.

The position correction can be repeated as often as necessary. However, if the sum of the corrective values exceeds 20 % of the nominal measuring range, then no position correction is possible.

Setup - Adjustment

VEGABAR 82 always measures pressure independently of the process variable selected in the menu item "*Application*". To output the selected process variable correctly, an allocation to 0 % and 100 % of the output signal must be carried out (adjustment).

With the application "*Level*", the hydrostatic pressure, e.g. with full and empty vessel, is entered for adjustment. See following example:

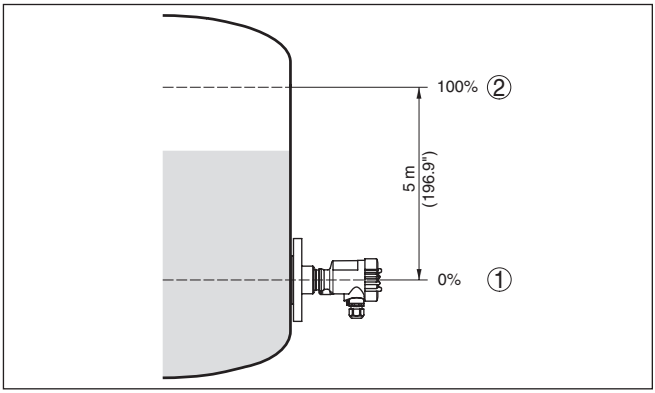


Fig. 35: Parameter adjustment example "Min./max. adjustment, level measurement"

1 Min. level = 0 % corresponds to 0.0 mbar
2 Max. level = 100 % corresponds to 490.5 mbar

If these values are not known, an adjustment with levels of for example 10 % and 90 % is also possible. By means of these settings, the real filling height is then calculated.

The real product level during this adjustment is not important, because the min./max. adjustment is always carried out without changing the product level. These settings can be made ahead of time without the instrument having to be installed.

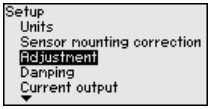
Note:
If the adjustment ranges are exceeded, the entered value will not be accepted. Editing can be interrupted with ***[ESC]*** or corrected to a value within the adjustment ranges.

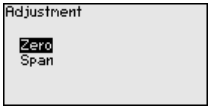
For the other process variables such as e.g. process pressure, differential pressure or flow, the adjustment is performed in like manner.

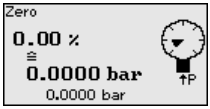
Setup - zero adjustment

Proceed as follows:

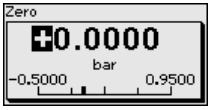
1. Select the menu item "*Setup*" with ***[->]*** and confirm with ***[OK]***. Now select with ***[->]*** the menu item "*zero adjustment*" and confirm with ***[OK]***.

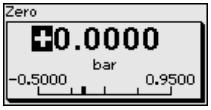






2. Edit the mbar value with ***[OK]*** and set the cursor to the requested position with ***[->]***.





3. Set the requested mbar value with ***[+]*** and store with ***[OK]***.
4. Move with ***[ESC]*** and ***[->]*** to the span adjustment

The zero adjustment is finished.

Information:
The zero adjustment shifts the value of the span adjustment. The span, i.e. the difference between these values, however, remains unchanged.

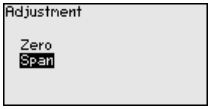
For an adjustment with pressure, simply enter the actual measured value indicated at the bottom of the display.

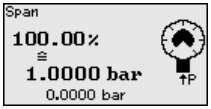
If the adjustment ranges are exceeded, the message "*Outside parameter limits*" appears. The editing procedure can be aborted with ***[ESC]*** or the displayed limit value can be accepted with ***[OK]***.

Setup - span adjustment

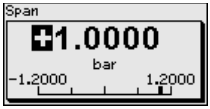
Proceed as follows:

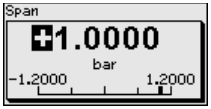
1. Select with ***[->]*** the menu item "Span adjustment" and confirm with ***[OK]***.





2. Edit the mbar value with ***[OK]*** and set the cursor to the requested position with ***[->]***.





3. Set the requested mbar value with ***[+]*** and store with ***[OK]***.

For an adjustment with pressure, simply enter the actual measured value indicated at the bottom of the display.

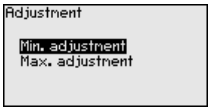
If the adjustment ranges are exceeded, the message "*Outside parameter limits*" appears. The editing procedure can be aborted with ***[ESC]*** or the displayed limit value can be accepted with ***[OK]***.

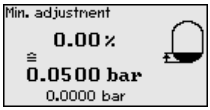
The span adjustment is finished.

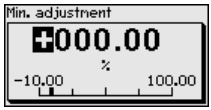
Setup - Min. adjustment Level

Proceed as follows:

1. Select the menu item "*Setup*" with ***[->]*** and confirm with ***[OK]***. Now select with ***[->]*** the menu item "*Adjustment*", then "*Min. adjustment*" and confirm with ***[OK]***.







2. Edit the percentage value with ***[OK]*** and set the cursor to the requested position with ***[->]***.
3. Set the requested percentage value (e.g. 10 %) with ***[+]*** and save with ***[OK]***. The cursor jumps now to the pressure value.
4. Enter the pressure value corresponding to the min. level (e.g. 0 mbar).
5. Save settings with ***[OK]*** and move with ***[ESC]*** and ***[->]*** to the max. adjustment.

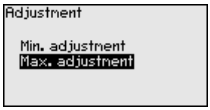
The min. adjustment is finished.

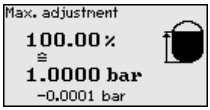
For an adjustment with filling, simply enter the actual measured value indicated at the bottom of the display.

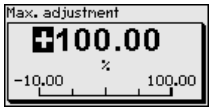
Setup - Max. adjustment Level

Proceed as follows:

1. Select with ***[->]*** the menu item "Max. adjustment" and confirm with ***[OK]***.







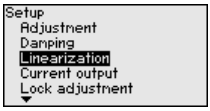
2. Edit the percentage value with ***[OK]*** and set the cursor to the requested position with ***[->]***.
3. Set the requested percentage value (e.g. 90 %) with ***[+]*** and save with ***[OK]***. The cursor jumps now to the pressure value.
4. Enter the pressure value for the full vessel (e.g. 900 mbar) corresponding to the percentage value.
5. Save settings with ***[OK]***

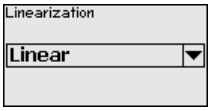
The max. adjustment is finished.

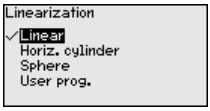
For an adjustment with filling, simply enter the actual measured value indicated at the bottom of the display.

Setup - Linearization

A linearization is necessary for all vessels in which the vessel volume does not increase linearly with the level - e.g. a horizontal cylindrical or spherical tank - and the indication or output of the volume is required. Corresponding linearization curves are preprogrammed for these vessels. They represent the correlation between the level percentage and vessel volume. The linearization applies to the measured value indication and the current output.







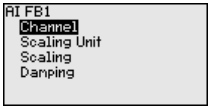
Caution:

Note the following, if the respective sensor is used as part of an overfill protection system according to WHG:

If a linearization curve is selected, the measuring signal is no longer necessarily linear to the filling height. This must be considered by the user especially when adjusting the switching point on the limit signal transmitter.

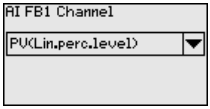
Setup - AI FB1

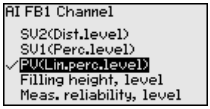
Since the adjustment is very comprehensive, the menu points of Function Blocks 1 (FB1) were put together in a submenu.



Setup - AI FB1 - Channel

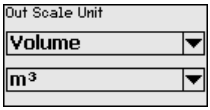
In menu item"*Channel*" you determine which measured value the output refers to.

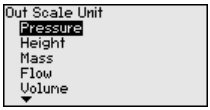


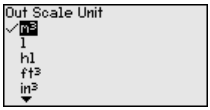


Setup - AI FB1 - Scaling format

In menu item "*Scaling format*" you define the scaling variable and the scaling unit for the level value on the display, e.g. volume in l.

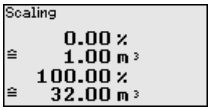


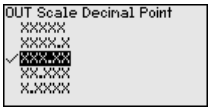




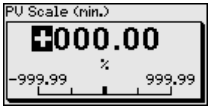
Setup - AI FB1 - Scaling

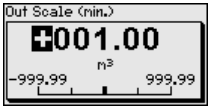
In menu item "*Scaling*" you define the scaling format on the display and the scaling of the measured level values for 0 % and 100 %.



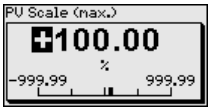


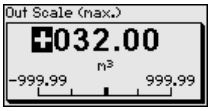
Level measured value min.





Measured level value max.

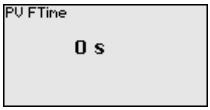


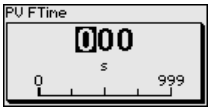


Setup - AI FB1 - Damping

To damp process-dependent measured value fluctuations, you can set a time of 0 … 999 s in this menu item.

The damping applies to the level and interface measurement.





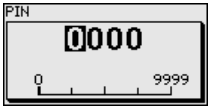
The default setting is a damping of 0 s.

Lock/release setup - Adjustment

In the menu item "*Lock/unlock adjustment*", you can protect the sensor parameters against unauthorized modification. The PIN is activated/deactivated permanently.

The following adjustment functions are possible without entering the PIN:

- Select menu items and show data
- Read data from the sensor into the display and adjustment module.

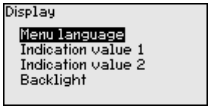


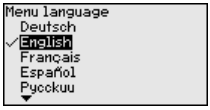
Caution:
With active PIN, adjustment via PACTware/DTM as well as other systems is also blocked.

You can change the PIN number under "*Additional adjustments - PIN*".

Display - Language

This menu item enables the setting of the requested national language.





The following languages are available:

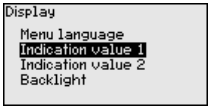
- German
- English
- French
- Spanish
- Russian
- Italian
- Dutch
- Portuguese
- Polish

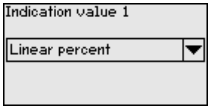
- Czech
- Turkish

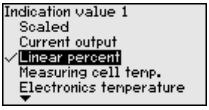
In the delivery status, the VEGABAR 82 is set to the ordered national language.

Display - Displayed value 1 and 2

In this menu item you can define the indication of the measured values on the display.



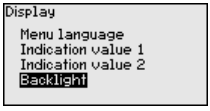




The default setting for the display value is "*Lin. percent*".

Display - Backlight

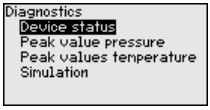
The display and adjustment module has a backlight for the display. In this menu item you switch on the lighting. You can find the required operating voltage in chapter "*Technical data*".

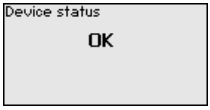


The lighting is switched off in delivery status.

Diagnostics - Device status

In this menu item, the device status is displayed.

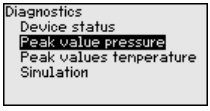


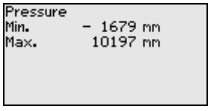


Diagnostics - Peak values, pressure

The respective min. and max. measured value is saved in the sensor. The two values are displayed in the menu item "*Peak values, pressure*".

In another window you can carry out a reset of the peak values separately.

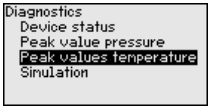


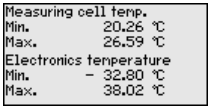


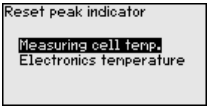
Diagnostics - Peak values, temperature

The respective min. and max. measured values of the measuring cell and electronics temperature are stored in the sensor. In the menu item "*Peak value, temperature*", both values are displayed.

In another window you can carry out a reset of the two peak values separately.

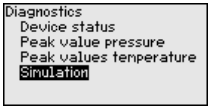


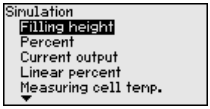


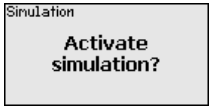


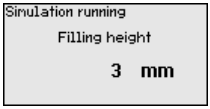
Diagnosis - Simulation

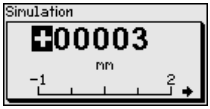
In this menu item you can simulate measured values via the current output. This allows the signal path to be tested, e.g. through downstream indicating instruments or the input card of the control system.

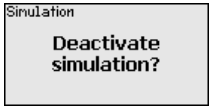












Select the requested simulation size and adjust the requested value.

Caution:
During simulation, the simulated value is outputted as 4 … 20 mA current value and digital HART signal.

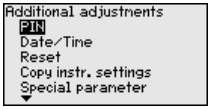
Push the ***[ESC]*** key to deactivate the simulation.

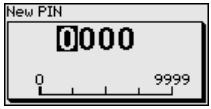
Information:
The simulation is terminated automatically 60 minutes after the last key has been pushed.

Additional settings - PIN

By entering a 4-digit PIN, you protect the sensor data against unauthorized access and unintentional modification.

In this menu item, the PIN is displayed or edited as well as modified. However, it is only available when the adjustment is released in the menu "*Setup/ Lock/release adjustment* ".

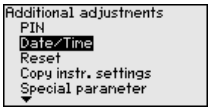


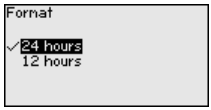


In delivery status, the PIN is "*0000*".

Additional adjustments - Date Time

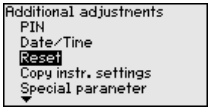
In this menu item, you adjust the internal clock of the sensor. There is no adjustment to summer/winter time.





Additional adjustments - Reset

With a reset, certain parameter adjustments carried out by the user are reset.



The following reset functions are available:

Delivery status: Restoring the parameter settings at the time of shipment from the factory incl. the order-specific settings. A user-pro-

grammable linearization curve as well as the measured value memory will be deleted.

Basic settings: Resetting the parameter settings incl. special parameters to the default values of the respective instrument. A programmed linearization curve as well as the measured value memory is deleted.

The following table shows the default values of the instrument. Depending on the instrument version or application, all menu items may not be available or some may be differently assigned:

Reset - Setup

Menu item	Parameter	Default value
Sensor address		126
Measurement loop name		Sensor
Application	Application process pressure Application level	No reset
	Slave for electronic differential pressure	No reset
Units	Unit of measurement	mbar (with nominal measuring range ≤400 mbar) bar (with nominal measuring ranges ≥1 bar)
	Temperature unit	°C
Position correction		0.00 bar
Adjustment	Zero/Min. adjustment	0.00 bar 0.00 %
	Span/Max. adjustment	Nominal measuring range in bar 100.00 %
Damping	Integration time	0.0 s
Linearization		Linear
AI FB 1	Channel	Primary Value
	Scaling format	Pressure
	Scaling	0 % corresponds to 0 bar 100 % corresponds to measuring range final value
	Damping	PV FTime 0 s
Lock adjustment		Released

Reset - Display

Menu item	Default value
Menu language	Order-specific
Displayed value 1	Signal output in %
Displayed value 2	Measuring cell temperature in °C
Backlight	Switched off

Reset - Diagnosis

Menu item	Parameter	Default value
Sensor status		-
Peak value	Pressure	Actual measured value
	Temperature	Actual temperature values from measuring cell, electronics
Simulation		Process pressure

Reset - Additional settings

Menu item	Parameter	Default value
PIN		0000
Date/Time		Actual date/Actual time
Copy instrument settings		
Special parameters		No reset
Scaling	Scaling size	Volume in l
	Scaling format	0 % corresponds to 0 l 100 % corresponds to 0 l

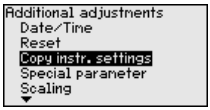
Additional adjustments - Copy instrument settings

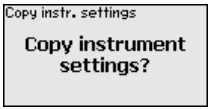
The instrument settings are copied with this function. The following functions are available:

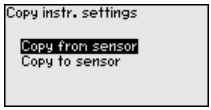
- Read from sensor: Read data from sensor and store into the display and adjustment module
- Write into sensor: Store data from the display and adjustment module back to the sensor

The following data or settings for adjustment of the display and adjustment module are saved:

- All data of the menu "*Setup*" and "*Display*"
- In the menu "*Additional adjustments*" the items "*Reset, Date/Time*"
- The user-programmable linearization curve







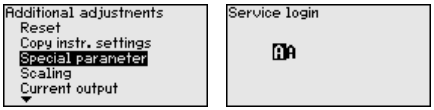
The copied data are permanently saved in an EEPROM memory in the display and adjustment module and remain there even in case of power failure. From there, they can be written into one or more sensors or kept as backup for a possible electronics exchange.

Note:
Before saving the data in the sensor, a safety check is made if the data match with the sensor. For this purpose the sensor type of the source data as well as the target sensor are displayed. If the data do not match, a failure message is outputted or the function is blocked. The data are only saved after release.

Additional adjustments - Special parameters

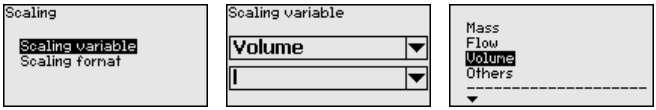
In this menu item you gain access to the protected area where you can enter special parameters. In exceptional cases, individual parameters can be modified in order to adapt the sensor to special requirements.

Change the settings of the special parameters only after having contacted our service staff.



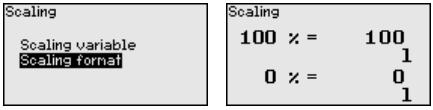
Setup - Scaling (1)

In menu item "*Scaling*" you define the scaling variable and the scaling unit for the level value on the display, e.g. volume in l.



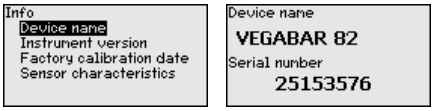
Setup - Scaling (2)

In menu item "*Scaling (2)*" you define the scaling format on the display and the scaling of the measured level value for 0 % and 100 %.



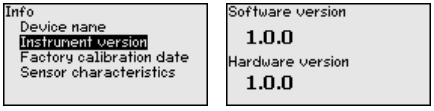
Info - Instrument name

In this menu item, you read out the instrument name and the instrument serial number:



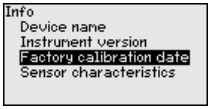
Info - Instrument version

In this menu item, the hardware and software version of the sensor is displayed.



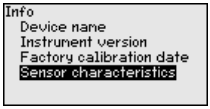
Info - Factory calibration date

In this menu item, the date of factory calibration of the sensor as well as the date of the last change of sensor parameters are displayed via the display and adjustment module or via the PC.



Info - Sensor characteristics

In this menu item, the features of the sensor such as approval, process fitting, seal, measuring range, electronics, housing and others are displayed.



6.5 Saving the parameter adjustment data

We recommended noting the adjusted data, e.g. in this operating instructions manual, and archiving them afterwards. They are thus available for multiple use or service purposes.

If the instrument is equipped with a display and adjustment module, the data in the sensor can be saved in the display and adjustment module. The procedure is described in the operating instructions manual "*Display and adjustment module*" in the menu item "*Copy sensor data*". The data remain there permanently even if the sensor power supply fails.

The following data or settings for adjustment of the display and adjustment module are saved:

- All data of the menu "*Setup*" and "*Display*"
- In the menu "*Additional adjustments*" the items "*Sensor-specific units, temperature unit and linearization*"
- The values of the user programmable linearization curve

The function can also be used to transfer settings from one instrument to another instrument of the same type. If it is necessary to exchange a sensor, the display and adjustment module is inserted into the replacement instrument and the data are likewise written into the sensor via the menu item "*Copy sensor data*".

7 Setup with PACTware

7.1 Connect the PC

Via the interface adapter directly on the sensor

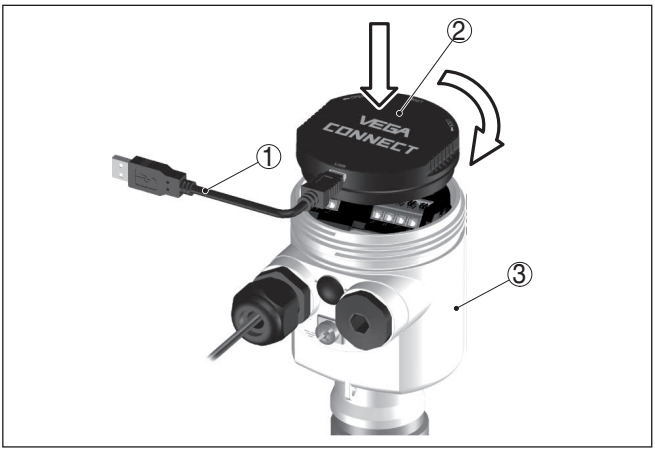


Fig. 36: Connection of the PC directly to the sensor via the interface adapter

1 USB cable to the PC
2 Interface adapter VEGACONNECT
3 Sensor

7.2 Parameter adjustment

Prerequisites

For parameter adjustment of the sensor via a Windows PC, the configuration software PACTware and a suitable instrument driver (DTM) according to FDT standard are required. The up-to-date PACTware version as well as all available DTMs are compiled in a DTM Collection. The DTMs can also be integrated into other frame applications according to FDT standard.

Note:
To ensure that all instrument functions are supported, you should always use the latest DTM Collection. Furthermore, not all described functions are included in older firmware versions. You can download the latest instrument software from our homepage. A description of the update procedure is also available in the Internet.

Further setup steps are described in the operating instructions manual "*DTM Collection/PACTware*" attached to each DTM Collection and which can also be downloaded from the Internet. Detailed descriptions are available in the online help of PACTware and the DTMs.

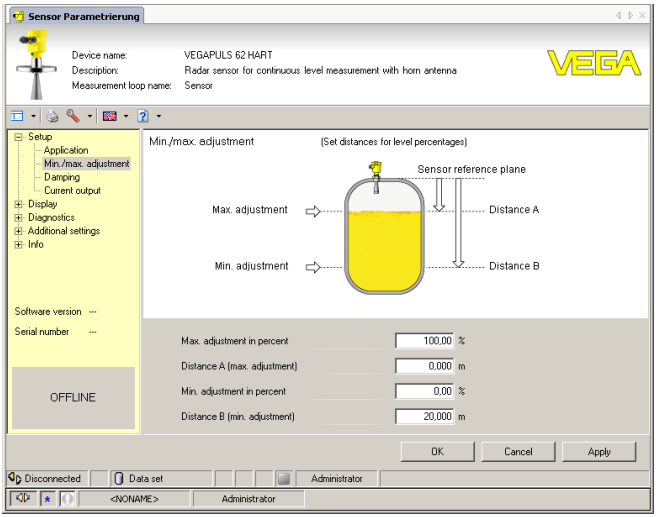


Fig. 37: Example of a DTM view

Standard/Full version

All device DTMs are available as a free-of-charge standard version and as a full version that must be purchased. In the standard version, all functions for complete setup are already included. An assistant for simple project configuration simplifies the adjustment considerably. Saving/printing the project as well as import/export functions are also part of the standard version.

In the full version there is also an extended print function for complete project documentation as well as a save function for measured value and echo curves. In addition, there is a tank calculation program as well as a multiviewer for display and analysis of the saved measured value and echo curves.

The standard version is available as a download under www.vega.com/downloads and "*Software*". The full version is available on CD from the agency serving you.

7.3 Saving the parameter adjustment data

We recommend documenting or saving the parameter adjustment data via PACTware. That way the data are available for multiple use or service purposes.

8 Set up with other systems

8.1 DD adjustment programs

Device descriptions as Enhanced Device Description (EDD) are available for DD adjustment programs such as, for example, AMS™ and PDM.

The files can be downloaded at www.vega.com/downloads under "*Software*".

9 Diagnosis, asset management and service

9.1 Maintenance

Maintenance

If the instrument is used properly, no special maintenance is required in normal operation.

In some applications, product buildup on the diaphragm can influence the measuring result. Depending on the sensor and application, take precautions to ensure that heavy buildup, and especially a hardening thereof, is avoided.

9.2 Diagnosis memory

The instrument has several memories which are available for diagnosis purposes. The data remain even with voltage interruption.

Measured value memory

Up to 60,000 measured values can be stored in the sensor in a ring memory. Each entry contains date/time as well as the respective measured value. Storable values are for example:

- Pressure
- Differential pressure
- Level
- Flow
- Density
- Interface
- Percentage value
- Lin. percent
- Scaled values
- Measuring cell temperature
- Electronics temperature

When the instrument is shipped, the measured value memory is active, saving distance, measurement certainty and electronics temperature every minute.

The requested values and recording conditions are set via a PC with PACTware/DTM or the control system with EDD. Data are thus read out and also reset.

Event memory

Up to 500 events are automatically stored with a time stamp in the sensor (non-deletable). Each entry contains date/time, event type, event description and value. Event types are for example:

- Modification of a parameter
- Switch-on and switch-off times
- Status messages (according to NE 107)
- Error messages (according to NE 107)

The data are read out via a PC with PACTware/DTM or the control system with EDD.

9.3 Asset Management function

The instrument features self-monitoring and diagnostics according to NE 107 and VDI/VDE 2650. In addition to the status messages in

the following tables there are more detailed error messages available under the menu item "*Diagnostics*" via the display and adjustment module, PACTware/DTM and EDD.

Status messages

The status messages are divided into the following categories:

- Failure
- Function check
- Out of specification
- Maintenance requirement

and explained by pictographs:

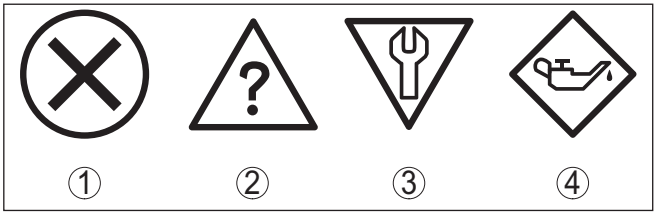


Fig. 38: Pictographs of the status messages

1 Failure - red
2 Out of specification - yellow
3 Function check - orange
4 Maintenance - blue

Failure: Due to a malfunction in the instrument, a failure message is outputted.

This status message is always active. It cannot be deactivated by the user.

Function check: The instrument is in operation, the measured value is temporarily invalid (for example during simulation).

This status message is inactive by default. It can be activated by the user via PACTware/DTM or EDD.

Out of specification: The measured value is unstable because the instrument specification is exceeded (e.g. electronics temperature).

This status message is inactive by default. It can be activated by the user via PACTware/DTM or EDD.

Maintenance: Due to external influences, the instrument function is limited. The measurement is affected, but the measured value is still valid. Plan in maintenance for the instrument because a failure is expected in the near future (e.g. due to buildup).

This status message is inactive by default. It can be activated by the user via PACTware/DTM or EDD.

Failure

The following table shows the error codes in the status message "*Failure*" and gives information on the reason and rectification. Keep in mind that some information is only valid with four-wire instruments.

Code Text message	Cause	Rectification
F013 no measured value available	– No valid measured value available	– Gauge pressure or low pressure, measuring cell defective
F017 Adjustment span too small	– Adjustment not within specification	– Change the adjustment according to the limit values
F025 Error in the linearization table	– Index markers are not continuously rising, for example illogical value pairs	– Check linearization table – Delete table/Create new
F036 no operable sensor software	– Failed or interrupted software update	– Repeat software update – Check electronics version – Exchanging the electronics – Send instrument for repair
F040 Error in the electronics	– Hardware defect	– Exchanging the electronics – Send instrument for repair
F041 Error in the electronics	– No connection to the sensor electronics	– Check connection to the sensor electronics (with detachable version)
F080	– General software error	– Disconnect operating voltage briefly
F113 Communication error, display and adjustment module Adjustment software PACTware out of order	– EMC interference	– Remove EMC influences
F125 Impermissible electronics temperature	– Temperature of the electronics in the non-specified section	– Check ambient temperature – Isolate electronics – Use instrument with higher temperature range
F260 Error in the calibration	– Error in the calibration carried out in the factory – Error in the EEPROM	– Exchanging the electronics – Send instrument for repair
F261 Error in the configuration	– Error during setup – Error when carrying out a reset	– Repeat setup – Repeat reset

Code Text message	Cause	Rectification
F265 Measurement function disturbed	– Sensor no longer carries out a measurement	– Carry out a reset – Disconnect operating voltage briefly
F266 Impermissible operating voltage	– Operating voltage below specified range	– Check electrical connection – if necessary, increase operating voltage

Function check

The following table shows the error codes and text messages in the status message "*Function check*" and provides information on causes as well as corrective measures.

Code Text message	Cause	Rectification
C700 Simulation active	– A simulation is active	– Finish simulation – Wait for the automatic end after 60 mins.

Out of specification

The following table shows the error codes and text messages in the status message "*Out of specification*" and provides information on causes as well as corrective measures.

Code Text message	Cause	Rectification
S600 Impermissible electronics temperature	– Temperature of the electronics in the non-specified section	– Check ambient temperature – Isolate electronics – Use instrument with higher temperature range
S603 Impermissible operating voltage	– Operating voltage below specified range	– Check electrical connection – if necessary, increase operating voltage

Maintenance

The following table shows the error codes and text messages in the status message "*Maintenance*" and provides information on causes as well as corrective measures.

Code Text message	Cause	Rectification
M500 Error in the delivery status	– Stored delivery status is incorrect	– Send instrument for repair

Code Text message	Cause	Rectification
M501 Error in the non-active linearization table	– Index markers are not continuously rising, for example illogical value pairs	– Check linearization table – Delete table/Create new
M502 Error in the event memory	– Hardware error EEPROM	– Exchanging the electronics – Send instrument for repair
M504 Error on an device interface	– Hardware defect	– Check connections – Exchanging the electronics – Send instrument for repair
M507 Error in the instrument settings	– Error during setup – Error when carrying out a reset	– Carry out reset and repeat setup

9.4 Rectify faults

Reaction when malfunctions occur

The operator of the system is responsible for taking suitable measures to rectify faults.

Procedure for fault rectification

The first measures are:

- Evaluation of fault messages, for example via the display and adjustment module
- Checking the output signal
- Treatment of measurement errors

Further comprehensive diagnostics options are available with a PC with PACTware and the suitable DTM. In many cases, the reasons can be determined in this way and faults rectified.

Reaction after fault rectification

Depending on the reason for the fault and the measures taken, the steps described in chapter "*Setup*" must be carried out again or must be checked for plausibility and completeness.

24 hour service hotline

Should these measures not be successful, please call in urgent cases the VEGA service hotline under the phone no. **+49 1805 858550**.

The hotline is also available outside normal working hours, seven days a week around the clock.

Since we offer this service worldwide, the support is provided in English. The service itself is free of charge, the only costs involved are the normal call charges.

9.5 Calculation of total deviation (according to DIN 16086)

Meaning of the total deviation

The total deviation of a pressure transmitter indicates the maximum measurement error to be expected in practice. It is also called maximum practical deviation or operational error.

According to DIN 16086, the total deviation F_{total} is the sum of the basic accuracy F_{perf} and the long-term stability F_{stab}:

$F_{total} = F_{perf} + F_{stab}$

The basic accuracy F_{perf} is composed of the deviation F_{KI} and the thermal change of zero signal and output span F_T:

$F_{perf} = \sqrt{((F_T)^2 + (F_{KI})^2)}$

To provide a better overview, the formula symbols are listed together below:

- F_{total}: Total deviation
- F_{perf}: Basic accuracy
- F_{stab}: Long-term drift
- F_T: Thermal change of zero signal and output span
- F_{KI}: Deviation

You can find the specifications in chapter "*Technical data*".

Practical example

Pressure measurement in the pipeline 8 bar (800 KPa)

Product temperature up to 50 °C

VEGABAR 82 with measuring range 10 bar, deviation < 0.075 %

Calculation of the turn down: TD = 10 bar/8 bar, TD = 1.25

Calculation

1. step: Calculation of the basic accuracy

$F_{perf} = \sqrt{((F_T)^2 + (F_{KI})^2)}$

$F_T = (0.15\ \%) \times (0.5 + 0.5 \times TD)$

$F_{KI} = 0.075\ \%$

$F_{perf} = \sqrt{((0.15\ \%) \times (0.5 + 0.5 \times TD)^2 + (0.075\ \%)^2)}$

$F_{perf} = 0.19\ \%$

Step 2: Calculation of the total deviation

$F_{total} = F_{perf} + F_{stab}$

$F_{stab} = (0.05\ \% \times TD)$

$F_{stab} = (0.05\ \% \times 1.25)$

$F_{stab} = 0.06\ \%$

$F_{total} = 0.19\ \% + 0.063\ \% = 0.25\ \%$

9.6 Exchange process assembly with version IP 68 (25 bar)

With version IP 68 (25 bar), the user can exchange the process assembly on site. Connection cable and external housing can be kept.

Required tools:

- Hexagon socket wrench, size 2

Caution:
The exchange may only be carried out in the complete absence of line voltage.

In Ex applications, only a replacement part with appropriate Ex approval may be used.

Proceed as follows when carrying out the exchange:

1. Losen the fixing screw with the hexagon socket wrench
2. Carefully detach the cable assembly from the process assembly

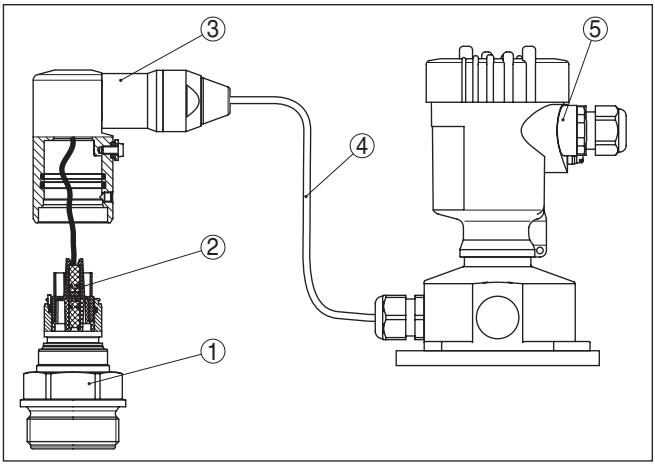


Fig. 39: VEGABAR 82 in IP 68 version, 25 bar and lateral cable outlet, external housing

1 Process assembly
2 Plug connector
3 Cable assembly
4 Connection cable
5 External housing

3. Loosen the plug connector
4. Mount the new process assembly on the measuring point
5. Plug the connector back in
6. Mount the cable assembly on the process assembly and turn it to the desired position
7. Tighten the fixing screw with the hexagon socket wrench

The exchange is finished.

If there is no replacement part available on site, one can be ordered from the agency serving you.

The necessary serial number can be found on the type label of the instrument or on the delivery note.

9.7 Exchanging the electronics module

In case of a defect, the user can replace the electronics module with another one of identical type.

In Ex applications, only instruments and electronics modules with appropriate Ex approval may be used.

If there is no electronics module available on site, one can be ordered from the agency serving you.

Ordering and exchange are possible **with** or **without** sensor serial number. The electronics module **with** serial number includes **order-specific** data such as factory setting, seal material etc. These are not included in the electronics module **without** serial number.

The serial number is stated on the type label of VEGABAR 82 or on the delivery note.

You can find detailed information on the electronics exchange in the booklet "*Operating instructions for electronics module VEGABAR series 80*".

9.8 Software update

The following components are required to update the sensor software:

- Sensor
- Voltage supply
- Interface adapter VEGACONNECT
- PC with PACTware
- Current sensor software as file

You can find the actual sensor software as well as detailed information of the procedure under "www.vega.com/downloads" and "*Software*".

You can find information about the installation in the download file.

Caution:
Instruments with approvals can be bound to certain software versions. Therefore make sure that the approval remains effective with a software update.

You can find detailed information on www.vega.com/downloads and "*Approvals*".

9.9 How to proceed in case of repair

You can find a repair form as well as detailed information on how to proceed under www.vega.com/downloads and "*Forms and certificates*".

By doing this you help us carry out the repair quickly and without having to call back for needed information.

If a repair is necessary, please proceed as follows:

- Print and fill out one form per instrument
- Clean the instrument and pack it damage-proof
- Attach the completed form and, if need be, also a safety data sheet outside on the packaging
- Please contact the agency serving you to get the address for the return shipment. You can find the agency on our home page www.vega.com.

10 Dismounting

10.1 Dismounting steps

Warning:
Before dismounting, be aware of dangerous process conditions such as e.g. pressure in the vessel or pipeline, high temperatures, corrosive or toxic products etc.

Take note of chapters "*Mounting*" and "*Connecting to power supply*" and carry out the listed steps in reverse order.

10.2 Disposal

The instrument consists of materials which can be recycled by specialised recycling companies. We use recyclable materials and have designed the parts to be easily separable.

Correct disposal avoids negative effects on humans and the environment and ensures recycling of useful raw materials.

Materials: see chapter "*Technical data*"

If you have no way to dispose of the old instrument properly, please contact us concerning return and disposal.

WEEE directive 2002/96/EG
This instrument is not subject to the WEEE directive 2002/96/EG and the respective national laws. Pass the instrument directly on to a specialised recycling company and do not use the municipal collecting points. These may be used only for privately used products according to the WEEE directive.

11 Supplement

11.1 Technical data

Materials and weights

Materials, wetted parts	
Process fitting	316L, PVDF, Alloy C-22, Alloy C-276, Duplex 1.4462, Titanium Grade 2
Diaphragm	Sapphire-ceramic® (> 99.9 % Al_2O_3 ceramic)
Joining material diaphragm/Basic element measuring cell	Glass (with double and form seal, non-wetted parts)
Measuring cell seal	FKM (VP2/A, A+P 70.16), EPDM (A+P 75.5/KW75F), FFKM (Kalrez 6375, Perlast G75S, Perlast G75B)
Seal for process fitting (in the scope of delivery)	
– Thread G½ (EN 837)	Klingersil C-4400
– Thread G1½ (DIN 3852-A)	Klingersil C-4400
– M44 x 1.25 (DIN 13), M30 x 1.5	FKM, FFKM, EPDM
Materials for applications in foodstuffs	
Surface quality hygienic fittings, typ.	R_a < 0.8 µm
Seal below wall mounting plage 316L with 3A approval	EPDM
Materials, non-wetted parts	
Electronics housing	Plastic PBT (polyester), Alu die-casting powder-coated, 316L
External housing	plastic PBT (Polyester), 316L
Socket, wall mounting plate external housing	plastic PBT (Polyester), 316L
Seal between base and wall mounting plate	EPDM (fixed connected)
Seal, housing cover	NBR (stainless steel housing), silicone (Alu/plastic housing)
Inspection window in housing cover for display and adjustment module	Polycarbonate (UL-746-C listed)
Ground terminal	316Ti/316L
Connection cable between transmitter and external electronics housing with IP 68 (25 bar) version	PE, PUR
Type label support on connection cable	PE hard
Connection cable with IP 68 (1 bar) version	PE
Weights	
Total weight VEGABAR 82 approx.	0.8 … 8 kg (1.764 … 17.64 lbs), depending on process fitting and housing

Input variable

Adjustment

Adjustment range of the min./max. adjustment relating to the nominal measuring range:

- Percentage value -10 … 110 %
- Pressure value -20 … 120 %

Adjustment range of the zero/span adjustment relating to the nominal measuring range:

- zero -20 … +95 %
- span -120 … +120 %[1)]
- Difference between zero and span max. 120 % of the nominal range

Recommended max. turn down 20 : 1 (no limitation)

Nominal measuring ranges and overload capability in bar/kPa

The specifications are only an overview and refer to the measuring cell. Limitations due to the material and version of the process fitting as well as the selected pressure type are possible. The specifications on the nameplate apply.

Nominal range	Overload capacity, max. pressure	Overload capacity, min. pressure
Gauge pressure		
0 … +0.025 bar/0 … +2.5 kPa (only for measuring cell ø 28 mm)	+5 bar/+500 kPa	-0.05 bar/-5 kPa
0 … +0.1 bar/0 … +10 kPa	+15 bar/+1500 kPa	-0.2 bar/-20 kPa
0 … +0.4 bar/0 … +40 kPa	+30 bar/+3000 kPa	-0.8 bar/-80 kPa
0 … +1 bar/0 … +100 kPa	+35 bar/+3500 kPa	-1 bar/-100 kPa
0 … +2.5 bar/0 … +250 kPa	+50 bar/+5000 kPa	-1 bar/-100 kPa
0 … +10 bar/0 … +1000 kPa	+90 bar/+9000 kPa	-1 bar/-100 kPa
0 … +25 bar/0 … +2500 kPa	+130 bar/+13000 kPa	-1 bar/-100 kPa
0 … +60 bar/0 … +6000 kPa	+200 bar/+20000 kPa	-1 bar/-100 kPa
0 … +100 bar/0 … +10000 kPa (only for measuring cell ø 28 mm)	+200 bar/+20000 kPa	-1 bar/-100 kPa
-1 … 0 bar/-100 … 0 kPa	+35 bar/+3500 kPa	-1 bar/-100 kPa
-1 … +1.5 bar/-100 … +150 kPa	+40 bar/+4000 kPa	-1 bar/-100 kPa
-1 … +10 bar/-100 … +1000 kPa	+90 bar/+9000 kPa	-1 bar/-100 kPa
-1 … +25 bar/-100 … +2500 kPa	+130 bar/+13000 kPa	-1 bar/-100 kPa
-1 … +60 bar/-100 … +6000 kPa	+200 bar/+20000 kPa	-1 bar/-100 kPa
-1 … +100 bar/-100 … +10000 kPa (only for measuring cell ø 28 mm)	+200 bar/+20000 kPa	-1 bar/-100 kPa
-0.05 … +0.05 bar/-5 … +5 kPa	+15 bar/+1500 kPa	-0.2 bar/-20 kPa
-0.2 … +0.2 bar/-20 … +20 kPa	+20 bar/+2000 kPa	-0.4 bar/-40 kPa
-0.5 … +0.5 bar/-50 … +50 kPa	+35 bar/+3500 kPa	-1 bar/-100 kPa
Absolute pressure		

[1)] Values less than -1 bar cannot be set.

Nominal range	Overload capacity, max. pressure	Overload capacity, min. pressure
0 … 0.1 bar/0 … 10 kPa	15 bar/1500 kPa	0.8 bar abs.
0 … 1 bar/0 … 100 kPa	35 bar/3500 kPa	0 bar abs.
0 … 2.5 bar/0 … 250 kPa	50 bar/5000 kPa	0 bar abs.
0 … 10 bar/0 … 1000 kPa	90 bar/9000 kPa	0 bar abs.
0 … 25 bar/0 … 2500 kPa	130 bar/13000 kPa	0 bar abs.
0 … 60 bar/0 … 6000 kPa	200 bar/20000 kPa	0 bar abs.
0 … +100 bar/0 … +10000 kPa (only for measuring cell ø 28 mm)	200 bar/20000 kPa	0 bar abs.

Nominal measuring ranges and overload capacity in psi

The specifications are only an overview and refer to the measuring cell. Limitations due to the material and version of the process fitting as well as the selected pressure type are possible. The specifications on the nameplate apply.

Nominal range	Overload capacity, max. pressure	Overload capacity, min. pressure
Gauge pressure		
0 … +0.4 psig (only for measuring cell ø 28 mm)	+75 psig	-0.725 psig
0 … +1.5 psig	+225 psig	-2.901 psig
0 … +5 psig	+435 psig	-11.60 psig
0 … +15 psig	+510 psig	-14.51 psig
0 … +30 psig	+725 psig	-14.51 psig
0 … +150 psig	+1300 psig	-14.51 psig
0 … +300 psig	+1900 psig	-14.51 psig
0 … +900 psig	+2900 psig	-14.51 psig
0 … +1500 psig (only for measuring cell ø 28 mm)	+2900 psig	-14.51 psig
-14.5 … 0 psig	+510 psig	-14.51 psig
-14.5 … +20 psig	+580 psig	-14.51 psig
-14.5 … +150 psig	+1300 psig	-14.51 psig
-14.5 … +300 psig	+1900 psig	-14.51 psig
-14.5 … +900 psig	+2900 psig	-14.51 psig
-14.5 … +1500 psig (only for measuring cell ø 28 mm)	+2900 psig	-14.51 psig
-0.7 … +0.7 psig	+225 psig	-2.901 psig
-3 … +3 psig	+290 psi	-5.800 psig
-7 … +7 psig	+510 psig	-14.51 psig
Absolute pressure		
0 … 1.5 psi	225 psig	0 psi

Nominal range	Overload capacity, max. pressure	Overload capacity, min. pressure
0 … 5 psi	435 psi	0 psi
0 … 15 psi	510 psi	0 psi
0 … 30 psi	725 psi	0 psi
0 … 150 psi	1300 psi	0 psi
0 … 300 psi	1900 psi	0 psi
0 … 900 psi	2900 psi	0 psi
0 … +1450 psig (only for measuring cell ø 28 mm)	2900 psig	0 psi

Output variable	
Output signal	digital output signal, format according to IEEE-754
Sensor address	126 (default setting)
Damping (63 % of the input variable)	0 … 999 s, adjustable
Profibus PA profile	3.02
Number of FBs with AI (function blocks with analogue input)	3
Default values	
– 1. FB	PV
– 2. FB	SV 1
– 3. FB	SV 2
Current value	
– Non-Ex and Ex ia instrument	10 mA, ±0.5 mA
– Ex-d instruments	16 mA, ±0.5 mA
Resolution, digital	< 1 mm (0.039 in)

Dynamic behaviour output	
Run-up time approx.	10 s

Dynamic characteristics, depending on medium, temperature and, if applicable, chemical seal

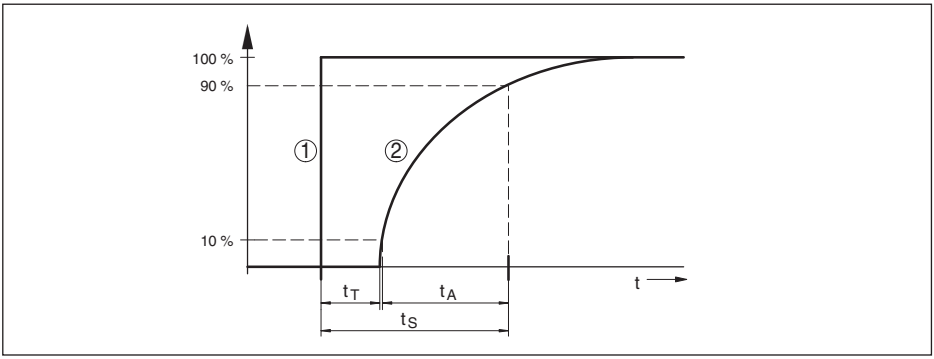


Fig. 40: Behaviour in case of sudden change of the process variable. t_T: dead time; t_A: rise time; t_S: jump response time

1 Process variable
2 Output signal

Dead time	< 45 ms
Rise time	> 35 ms (10 … 90 %)
Step response time	> 80 ms (ti: 0 s, 10 … 90 %)
Damping (63 % of the input variable)	0 … 999 s, adjustable

Additional output parameter - temperature

Processing is made via output signal HART multidrop, Profibus PA, Foundation Fieldbus and Modbus

Range	-60 … +150 °C (-76 … +302 °F)
Resolution	< 0.2 K
Accuracy	
– in the range of 0 … +100 °C (+32 … +212 °F)	±2 K
– In the range of -60 … 0 °C (-76 … +32 °F) and +100 … +150 °C (+212 … +302 °F)	typ. ±4 K

Reference conditions and actuating variables (according to DIN EN 60770-1)

Reference conditions according to DIN EN 61298-1

– Temperature	+15 … +25 °C (+59 … +77 °F)
– Relative humidity	45 … 75 %
– Air pressure	860 … 1060 mbar/86 … 106 kPa (12.5 … 15.4 psig)
Determination of characteristics	Limit point adjustment according to IEC 61298-2
Characterstic curve	Linear
Reference installation position	upright, diaphragm points downward
Influence of the installation position	< 0.2 mbar/20 Pa (0.003 psig)

Deviation (according to IEC 60770)

Specifications refer to the set span. Turn down (TD) is the ratio: nominal measuring range/set span.

Accuracy class	Non-linearity, hysteresis and repeatability with TD 1 : 1 up to 5 : 1	Non-linearity, hysteresis and repeatability with 5 : 1
0.05 %	< 0.05 %	< 0.01 % x TD
0.1 %	< 0.1 %	< 0.02 % x TD
0.2 %	< 0.2 %	< 0.04 % x TD

Influence of the product or ambient temperature

Thermal change zero signal and output span

Turn down (TD) is the relation nominal measuring range/adjusted span.

Measuring cell - Standard

Medium or ambient temperature T	Accuracy class 0.05 %, 0.1 %	Accuracy class 0.2 %	Accuracy class 0.2 % with measuring range 0.1 bar_{abs}
-40 … 0 °C (-40 … +32 °F)	< {0.15 % + 0.015 %/K x (-T)} x {0.5+0.5 x TD}	< {0.1 % + 0.03 %/K x (-T)} x {0.5+0.5 x TD}	< {0.30 % + 0.03 %/K x (-T)} x {0.5+0.5 x TD}
0 … 40 °C (+32 … +104 °F)	< {0.0075 %/K x (T - 20 °C)} x {0.5+0.5 x TD}	< {0.005 %/K x (T - 20 °C)} x {0.5+0.5 x TD}	< {0.015 %/K x (T - 20 °C)} x {0.5+0.5 x TD}
40 … 100 °C (+104 … +212 °F)	< {0.15 % } x {0.5+0.5 x TD}	< {0.005 %/K x (T - 20 °C)} x {0.5+0.5 x TD}	< {0.3 % } x {0.5+0.5 x TD}
100 … 130 °C (+212 … +266 °F)	< {0.15 % + 0.005 %/K x (T - 100 °C)} x {0.5+0.5 x TD}	< {0.40 % + 0.01 %/K x (T - 100 °C)} x {0.5+0.5 x TD}	< {0.30 % + 0.01 %/K x (T - 100 °C)} x {0.5+0.5 x TD}

Measuring cell - climate-compensated

Compensated temperature range 0 … +100 °C (+32 … +212 °F)

Non-compensated temperature range -40 … 0 °C (-40 … +32 °F), -100 … 130 °C (212 … +276 °F)

Nominal measuring range in bar/kPa	Nominal measuring range in psig	In the compensated temperature range	In the non-compensated temperature range
0 … 10 bar/0 … 1000 kPa	0 … 150 psig	< {0.05 % + 0.1 x (0.5+0.5 x TD)}	< {0.1 % + 0.15 x (0.5+0.5 x TD)}
0 … 25 bar/0 … 2500 kPa	0 … 350 psig		
0 … 60 bar/0 … 6000 kPa	0 … 900 psig		
0 … 100 bar/0 … 10000 kPa	0 … 1450 psig		
-1 … 0 bar/-100 … 0 kPa	-15 … 0 psig		
-1 … 1.5 bar/-100 … 150 kPa	-15 … 25 psig		
-1 … 10 bar/-100 … 1000 kPa	-15 … 150 psig		
-1 … 25 bar/-100 … 2500 kPa	-15 … 350 psig		
-1 … 60 bar/-100 … 6000 kPa	-15 … 900 psig		
-1 … 100 bar/-100 … 10000 kPa	-15 … 1450 psig		

Nominal measuring range in bar/ kPa	Nominal measuring range in psig	In the compensated temperature range	In the non-compensated temperature range
0 … 1 bar/0 … 100 kPa	0 … 15 psig	< {0.1 % + 0.2 x (0.5+0.5 x TD)}	< {0.1 % + 0.3 x (0.5+0.5 x TD)}
0 … 2.5 bar/0 … 250 kPa	0 … 35 psig		
-0.5 … 0.5 bar/-50 … 50 kPa	-7 … 7 psig		
-0.2 … 0.2 bar/-20 … 20 kPa	-3 … 3 psig	< {0.15 % + 0.4 x (0.5+0.5 x TD)}	< {0.15 % + 0.6 x (0.5+0.5 x TD)}
0 … 0.4 bar/0 … 40 kPa	0 … 6 psig		

>>>Long-term stability (according to DIN 16086 and IEC 60770-1)

Specifications refer to the set span. Turn down (TD) is the ratio: nominal measuring range/set span.

Long-term drift of the zero signal

Time period	Measuring cell ø 28 mm	Measuring cell ø 28 mm Measuring range 0 … +0.025 bar/0 … +2.5 kPa	Measuring cell ø 17.5 mm
One year	< 0.05 % x TD	< 0.1 % x TD	< 0.1 % x TD
Five years	< 0.1 % x TD	< 0.2 % x TD	< 0.2 % x TD
Ten years	< 0.2 % x TD	< 0.4 % x TD	< 0.4 % x TD

Long-term drift of the zero signal - Version climate-compensated

Nominal measuring range in bar/ kPa	Nominal measuring range in psig	Measuring cell ø 28 mm	Measuring cell ø 17.5 mm
0 … 0.4 bar/0 … 40 kPa	0 … 6 psig	< (1 % x TD)/year	< (1.5 % x TD)/year
-0.2 … 0.2 bar/-20 … 20 kPa	-3 … 3 psig		
0 … 1 bar/0 … 100 kPa	0 … 15 psig	< (0.25 % x TD)/year	< (0.375 % x TD)/year
0 … 2.5 bar/0 … 250 kPa	0 … 35 psig		
-1 … 0 bar/-100 … 0 kPa	-15 … 0 psig		
-1 … 1.5 bar/-100 … 150 kPa	-15 … 25 psig		
-0.5 … 0.5 bar/-50 … 50 kPa	-7 … 7 psig		
0 … 10 bar/0 … 1000 kPa	0 … 150 psig	< (0.1 % x TD)/year	< (0.15 % x TD)/year
0 … 25 bar/0 … 2500 kPa	0 … 350 psig		
0 … 60 bar/0 … 6000 kPa	0 … 900 psig		
0 … 100 bar/0 … 6000 kPa	0 … 1450 psig		
-1 … 10 bar/-100 … 1000 kPa	-15 … 150 psig		
-1 … 25 bar/-100 … 2500 kPa	-15 … 350 psig		
-1 … 60 bar/-100 … 6000 kPa	-15 … 900 psig		

Ambient conditions

Version	Ambient temperature	Storage and transport temperature
Standard version	-40 … +80 °C (-40 … +176 °F)	-60 … +80 °C (-76 … +176 °F)
Version IP 66/IP 68 (1 bar)	-20 … +80 °C (-4 … +176 °F)	-20 … +80 °C (-4 … +176 °F)
Version IP 68 (25 bar) with connection cable PUR	-20 … +80 °C (-4 … +176 °F)	-20 … +80 °C (-4 … +176 °F)
Version IP 68 (25 bar), connection cable PE	-20 … +60 °C (-4 … +140 °F)	-20 … +60 °C (-4 … +140 °F)

Process conditions

Product temperature depending on the measuring cell seal[2)]

The specifications are an overview. The specification on the type plate are valid.

Measuring cell seal	Product temperature - standard version	Product temperature - version with extended temperature range
FKM (VP2/A)	-20 … +130 °C (-4 … +266 °F)	-20 … +150 °C (-4 … +302 °F)
FKM (A+P 70.16)	-40 … +130 °C (-40 … +266 °F)	-
FKM (ET 7067)	-20 … +130 °C (-4 … +266 °F) 1 h: 140 °C/284 °F cleaning temperature	-
EPDM (A+P 75.5/KW75F)	-40 … +130 °C (-40 … +266 °F) 1 h: 140 °C/284 °F cleaning temperature	-40 … +150 °C (-40 … +302 °F)
EPDM (ET 7056)	-40 … +130 °C (-40 … +266 °F) 1 h: 140 °C/284 °F cleaning temperature	-
FFKM (Kalrez 6375)	-20 … +130 °C (-4 … +266 °F)	-20 … +150 °C (-4 … +302 °F)
FFKM (Perlast G75S)	-15 … +130 °C (-4 … +266 °F)	-15 … +150 °C (5 … +302 °F)
FFKM (Perlast G75B)	-15 … +130 °C (-4 … +266 °F)	-15 … +150 °C (5 … +302 °F)
FFKM (Chemraz 535)	-30 … +130 °C (-22 … +266 °F)	-
FEPM (Fluoraz SD890)	-5 … +130 °C (-22 … +266 °F)	-

Product temperature depending on the ambient temperature

Ambient temperature	Product temperature
+50 °C (+122 °F)	+150 °C (+302 °F)
+80 °C (+176 °F)	+100 °C (+212 °F)

Mechanical stress, depending on the instrument version

Vibration resistance	4 g at 5 … 200 Hz according to EN 60068-2-6 (vibration with resonance)
Shock resistance	100 g, 6 ms according to EN 60068-2-27 (mechanical shock)

[2)] With process fitting PVDF, max. 100 °C (212 °F).

Electromechanical data - version IP 66/IP 67 and IP 66/IP 68; 0.2 bar

Options of the cable entry	
– Cable gland	M20 x 1.5
– Cable diameter (options)	5 … 9 mm (0.20 … 0.35 in) 6 … 12 mm (0.24 … 0.47 in) 10 … 14 mm (0.39 … 0.55 in)
– Cable entry	½ NPT
– Blind plug	M20 x 1.5; ½ NPT
– Closing cap	M20 x 1.5; ½ NPT
Plug options	
– Signal circuit	Plug M12 x 1, according to ISO 4400, Harting HAN, 7/8" FF
– Indication circuit	M12 x 1 plug
Wire cross-section (spring-loaded terminals)	
– Massive wire, cord	0.2 … 2.5 mm² (AWG 24 … 14)
– Stranded wire with end sleeve	0.2 … 1.5 mm² (AWG 24 … 16)

Electromechanical data - version IP 66/IP 68 (1 bar)

Connection cable	
– Configuration	four wires, one breather capillary, one suspension cable, screen braiding, metal foil, mantle
– Wire cross-section	0.5 mm² (AWG 20)
– Wire resistance	< 0.036 Ω/m
– Tensile strength	< 1200 N (270 lbf)
– Standard length	5 m (16.4 ft)
– Max. length	180 m (590.6 ft)
– Min. bending radius	25 mm (0.984 in) with 25 °C (77 °F)
– Diameter approx.	8 mm (0.315 in)
– Colour - Non-Ex version	Black
– Colour - Ex-version	Blue

Electromechanical data - version IP 68 (25 bar)

Connection cable between IP 68 instrument and external housing	
– Configuration	four wires, one suspension wire, one breather capillary, screen braiding, metal foil, mantle
– Wire cross-section	0.5 mm² (AWG 20)
– Wire resistance	< 0.036 Ω/m (0.011 Ω/ft)
– Standard length	5 m (16.40 ft)
– Max. length	180 m (590.5 ft)
– Min. bending radius at 25 °C/77 °F	25 mm (0.985 in)
– Diameter approx.	8 mm (0.315 in)
– Colour	Blue

Cable entry/plug[3]	
– External housing	– 1 x cable gland M20 x 1.5 (cable: ø 5 … 9 mm), 1 x blind plug M20 x 1.5 or: – 1 x plug (depending on the version), 1 x blind stopper M20 x 1.5
Spring-loaded terminals for wire cross-section up to	2.5 mm² (AWG 14)

Display and adjustment module	
Display element	Display with backlight
Measured value indication	
– Number of digits	5
– Size of digits	W x H = 7 x 13 mm
Adjustment elements	4 keys
Protection rating	
– unassembled	IP 20
– mounted into the housing without cover	IP 40
Materials	
– Housing	ABS
– Inspection window	Polyester foil

Interface to the external display and adjustment unit	
Data transmission	digital (I^2C-Bus)
Configuration, connection cable	4-wire, screened
Cable length max.	
– Sensors with signal output 4 … 20 mA, 4 … 20 mA/HART	50 m
– Sensors with signal output Profibus PA, Foundation Fieldbus	25 m

Interface to the slave sensor	
Data transmission	digital (I^2C-Bus)
Configuration, connection cable	4-wire, screened
Cable length max.	25 m

Integrated clock	
Date format	Day.Month.Year
Time format	12 h/24 h
Time zone Ex factory	CET
Rate deviation max.	10.5 min/year

[3] Depending on the version M12 x 1, according to ISO 4400, Harting, 7/8" FF.

Measurement electronics temerature

Resolution	1 °C (1.8 °F)
Accuracy	±1 °C (1.8 °F)

Voltage supply

Operating voltage

– Non-Ex, Ex-d instrument	9 … 32 V DC
– EEx-ia instrument - Power supply FISCO model	9 … 17.5 V DC
– EEx-ia instrument - Power supply ENTITY model	9 … 24 V DC

Number of sensors per DP/PA segment coupler, max.

– Non-Ex	32
– Ex	10

Potential connections in the instrument

Electronics	Not non-floating
Ground terminal	Galvanically connected with the process fitting

Electrical protective measures

Housing material	Version	IP-protection class	NEMA protection
Plastic	Single chamber	IP 66/IP 67	NEMA 4X/6P
	Double chamber	IP 66/IP 67	NEMA 4X
Aluminium	Single chamber	IP 66/IP 68 (0.2 bar) IP 68 (1 bar)	NEMA 4X/6P -
	Double chamber	IP 66/IP 67 IP 66/IP 68 (0.2 bar)	NEMA 4X NEMA 4X
Stainless steel, electro-polished	Single chamber Single chamber	IP 69K IP 66/IP 68 (0.2 bar)	- NEMA 4X/6P
Stainless steel, investment casting	Single chamber	IP 66/IP 68 (0.2 bar) IP 68 (1 bar)	NEMA 4X/6P NEMA 4X
	Double chamber	IP 66/IP 67 IP 66/IP 68 (0.2 bar)	NEMA 4X NEMA 4X
Stainless steel	Transmitter for external housing	IP 68 (25 bar)	-

Overvoltage category	III
Protection class	II

Approvals

Instruments with approvals can have different technical data depending on the version.

For that reason the associated approval documents of these instruments must be carefully noted. They are part of the delivery or can be downloaded under www.vega.com and "*VEGA Tools*" as well as under "Downloads" and "*Approvals*".

11.2 Communication Profibus PA

Instrument master file

The instrument master file (GSD) contains the characteristic data of the Profibus PA instrument. These data are, e.g. the permissible transmission rates as well as information on diagnostics values and the format of the measured value outputted by the PA instrument.

A bitmap file is also provided for the Profibus network planning tool. This file is installed automatically when the GSD file is integrated. The bitmap file is used for symbolic indication of the PA instrument in the configuration tool.

ID number

Each Profibus instrument gets an unambiguous ident number (ID number) from the Profibus user organisation (PNO). This ID number is also included in the name of the GSD file. Optionally to this manufacturer-specific GSD file, PNO provides also a general so-called profile-specific GSD file. If the general GSD file is used, the sensor must be set to the profile-specific ident number via the DTM software. By default, the sensor operates with the manufacturer-specific ID number. When using the instruments on a segment coupler SK-2 or SK-3, no special GSD files are required.

Module of the PA sensors

For the cyclic data traffic, VEGABAR 82 provides the following modules:

- AI FB1 (OUT)
  - Out value of the AI FB1 after scaling
- AI FB2 (OUT)
  - Out value of the AI FB2 after scaling
- AI FB3 (OUT)
  - Out value of the AI FB3 after scaling
- Free Place
  - This module must be used if a value in the data telegram of the cyclical data traffic should not be used (e.g. replacement of temperature and Additional Cyclic Value)

A maximum of three modules can be active. By means of the configuration software of the Profibus master you can determine the configuration of the cyclical data telegram with these modules. The procedure depends on the respective configuration software.

Note:
The modules are available in two versions:

- Short for Profibus master supporting only one "Identifier Format" byte, e.g. Allen Bradley
- Long for Profibus master only supporting the "Identifier Format" byte, e.g. Siemens S7-300/400

Examples of telegram configuration

In the following you will see how the modules can be combined and how the appendant data telegram is structured.

Example 1

- AI FB1 (OUT)
- AI FB2 (OUT)
- AI FB3 (OUT)

Byte-No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Format	IEEE-754-Floating point value				Status	IEEE-754-Floating point value				Status	IEEE-754-Floating point value				Status
Value	AI FB1 (OUT)				AI FB1	AI FB2 (OUT)				AI FB2	AI FB3 (OUT)				AI FB3

Example 2

- AI FB1 (OUT)
- Free Place
- Free Place

Byte-No.	1	2	3	4	5
Format	IEEE-754-Floating point value				Status
Value	AI FB1 (OUT)				AI FB1

Note:
Bytes 6-15 are not used in this example.

Data format of the output signal

Byte4	Byte3	Byte2	Byte1	Byte0
Status	Value (IEEE-754)			

Fig. 41: Data format of the output signal

The status byte corresponds to profile 3.02 "Profibus PA Profile for Process Control Devices" coded. The status "Measured value OK" is coded as 80 (hex) (Bit7 = 1, Bit6 … 0 = 0).

The measured value is transferred as a 32 bit floating point number in the IEEE-754 format.

Byte n								Byte n+1								Byte n+2								Byte n+3							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
VZ	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	2^{-1}	2^{-2}	2^{-3}	2^{-4}	2^{-5}	2^{-6}	2^{-7}	2^{-8}	2^{-9}	2^{-10}	2^{-11}	2^{-12}	2^{-13}	2^{-14}	2^{-15}	2^{-16}	2^{-17}	2^{-18}	2^{-19}	2^{-20}	2^{-21}	2^{-22}	2^{-23}
Sign Bit	Exponent							Significant								Significant								Significant							

$$Value = (-1)^{VZ} \bullet 2^{(Exponent - 127)} \bullet (1 + Significant)$$

Fig. 42: Data format of the measured value

Coding of the status byte associated with the PA output value

You can find further information for the coding of the status byte in the Device Description 3.02 on www.profibus.com.

Status code	Description according to Profibus standard	Possible cause
0 x 00	bad - non-specific	Flash-Update active

Status code	Description according to Profibus standard	Possible cause
0 x 04	bad - configuration error	– Adjustment error – Configuration error with PV-Scale (PV-Span too small) – Unit irregularity – Error in the linearization table
0 x 0C	bad - sensor failure	– Hardware error – Converter error – Leakage pulse error – Trigger error
0 x 10	bad - sensor failure	– Measured value generation error – Temperature measurement error
0 x 1f	bad - out of service constant	"Out of Service" mode switched on
0 x 44	uncertain - last unstable value	Failsafe replacement value (Failsafe-Mode = "Last value" and already valid measured value since switching on)
0 x 48	uncertain substitute set	– Switch on simulation – Failsafe replacement value (Failsafe-Mode = "Fsafe value")
0 x 4c	uncertain - initial value	Failsafe replacement value (Failsafe-Mode = "Last valid value" and no valid measured value since switching on)
0 x 51	uncertain - sensor; conversion not accurate - low limited	Sensor value < lower limit
0 x 52	uncertain - sensor; conversion not accurate - high limited	Sensor value > upper limit
0 x 80	good (non-cascade) - OK	OK
0 x 84	good (non-cascade) - active block alarm	Static revision (FB, TB) changed (10 sec. active, after the parameter of the static category has been written)
0 x 89	good (non-cascade) - active advisory alarm - low limited	Lo-Alarm
0 x 8a	good (non-cascade) - active advisory alarm - high limited	Hi-Alarm
0 x 8d	good (non-cascade) - active critical alarm - low limited	Lo-Lo-Alarm
0 x 8e	good (non-cascade) - active critical alarm - high limited	Hi-Hi-Alarm

11.3 Dimensions

The following dimensional drawings represent only an extract of the possible versions. Detailed dimensional drawings can be downloaded at www.vega.com under "*Downloads*" and "*Drawings*".

Plastic housing

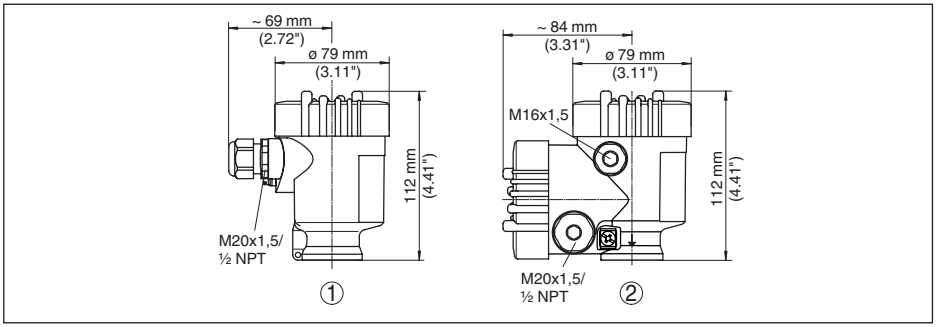


Fig. 43: Housing versions in protection IP 66/IP 67 - with integrated display and adjustment module the housing is 9 mm/0.35 in higher

1 Single chamber version
2 Double chamber version

Aluminium housing

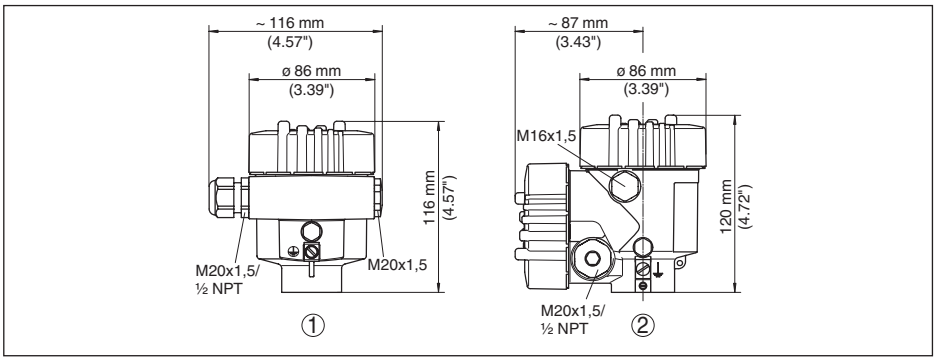


Fig. 44: Housing versions in protection IP 66/IP 67 - with integrated display and adjustment module the housing is 9 mm/0.35 in higher

1 Single chamber version
2 Double chamber version

Aluminium housing in protection rating IP 66/IP 68 (1 bar)

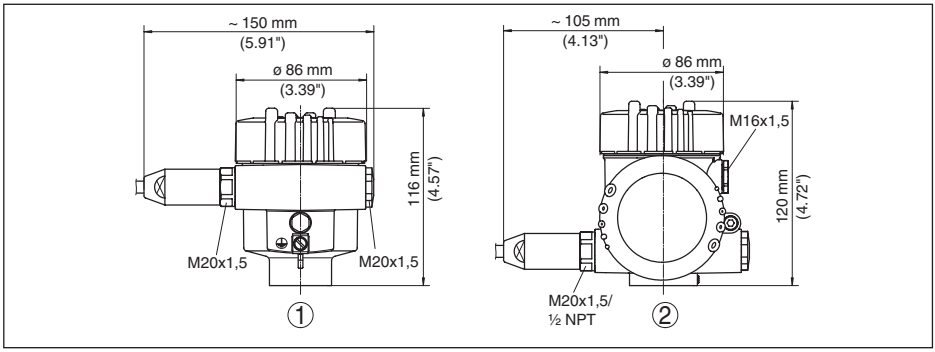


Fig. 45: Housing versions in protection IP66/IP68 (1 bar) - with integrated display and adjustment module the housing is 9 mm/0.35 in higher

1 Single chamber version
2 Double chamber version

Stainless steel housing

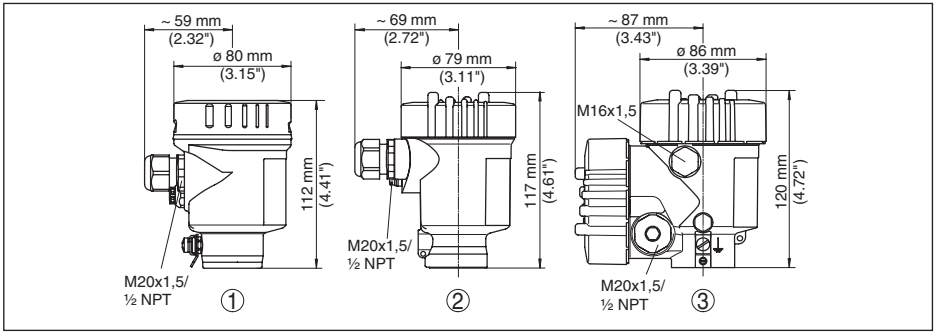


Fig. 46: Housing versions in protection IP 66/IP 67 - with integrated display and adjustment module the housing is 9 mm/0.35 in higher

1 Single chamber version, electropolished
2 Single chamber version, precision casting
3 Double chamber version, precision casting

Stainless steel housing in protection rating IP 66/IP 68 (1 bar)

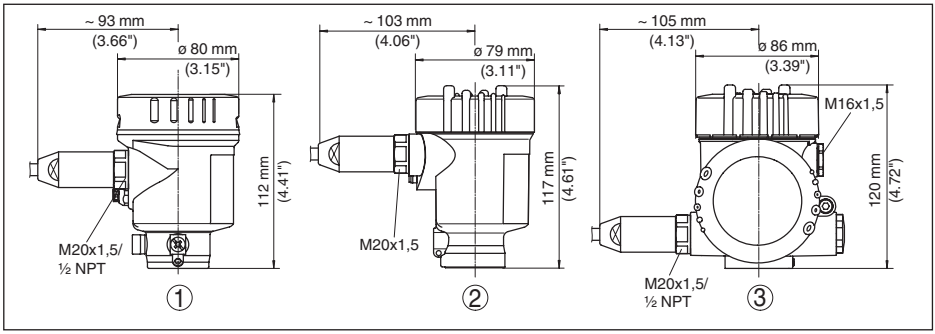


Fig. 47: Housing versions in protection IP66/IP68 (1 bar) - with integrated display and adjustment module the housing is 9 mm/0.35 in higher

1 *Single chamber version, electropolished*
2 *Single chamber version, precision casting*
3 *Double chamber version, precision casting*

Stainless steel housing in protection IP 69K

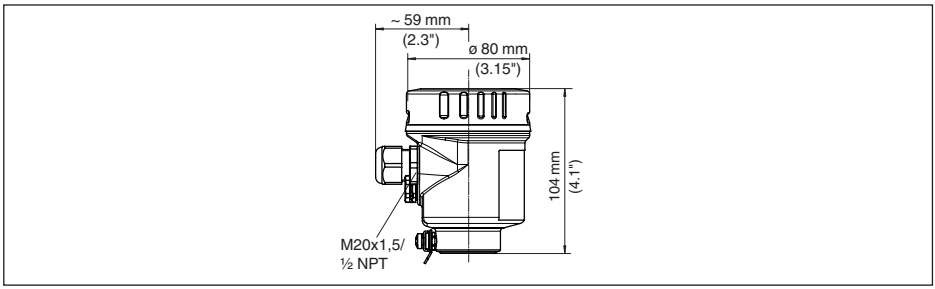


Fig. 48: Housing version in protection IP 69K - ith integrated display and adjustment module the housing is 9 mm/0.35 in higher

1 *Single chamber version, electropolished*

External housing with IP 68 version

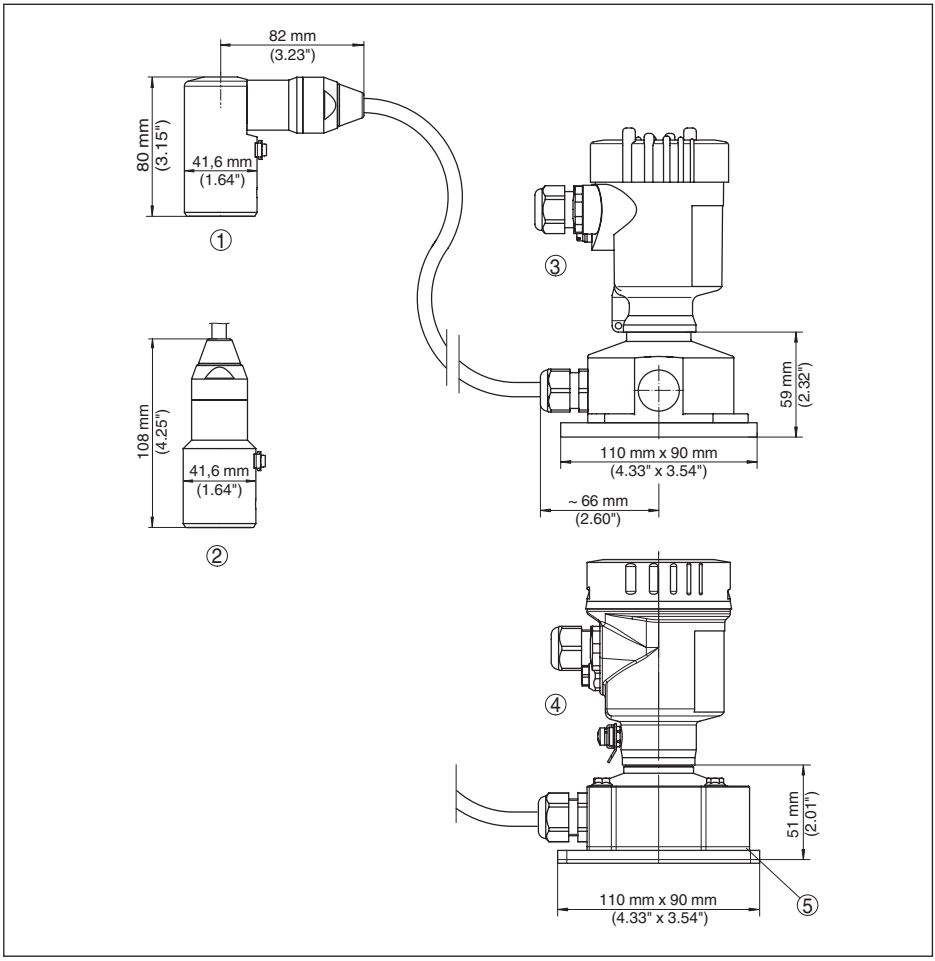


Fig. 49: VEGABAR 82, IP 68 version with external housing

1 *Lateral cable outlet*
2 *Axial cable outlet*
3 *Plastic version*
4 *Stainless steel version*
5 *Seal 2 mm (0.079 in) - only with 3A approval*

VEGABAR 82, threaded fitting not front-flush

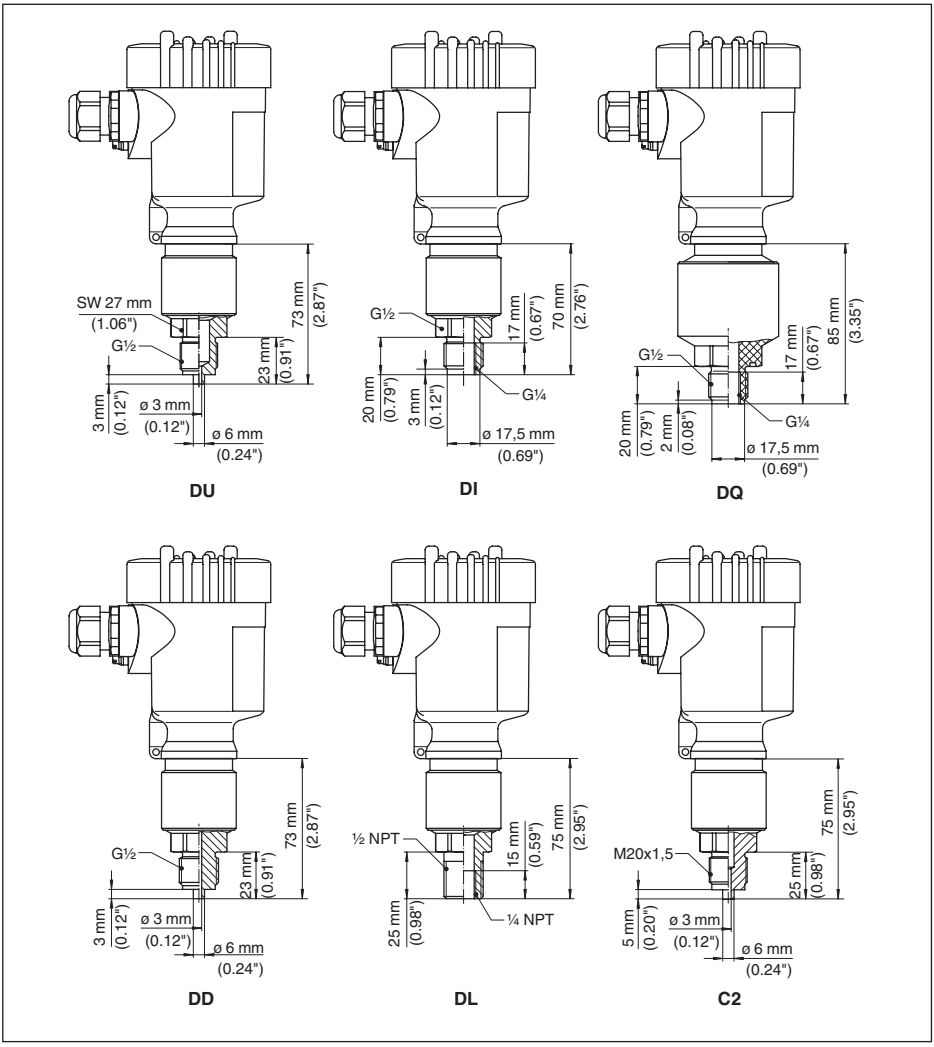


Fig. 50: VEGABAR 82, threaded fitting not front-flush

DU G½ manometer connection (EN 837)
DI G½ A inside G¼ (ISO 228-1)
DQ G½ A inside G¼ A PVDF (ISO 228-1)
DD G½ manometer connection (EN 837) volume-reduced
DL ½ NPT
C2 M20 x 1.5 manometer connection (EN 837)

For the version with "*Second Line of Defense*", the measure of length increases by 17 mm (0.67 in).

VEGABAR 82, threaded fitting front-flush

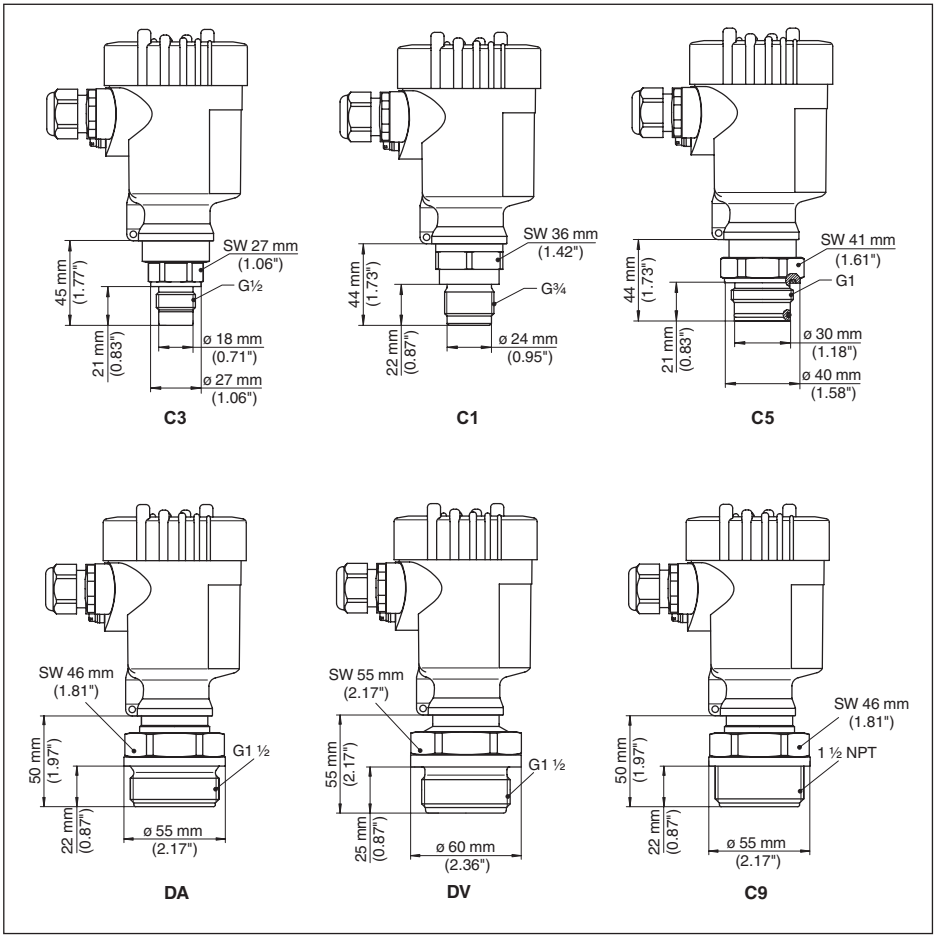


Fig. 51: VEGABAR 82, threaded fitting front-flush

C3 G½ (ISO 228-1
C1 G¾ (DIN 3852-E)
C5 G1 A (ISO 228-1)
DA G1½ (DIN 3852-A)
DV G1½ A PVDF (DIN 3852-A-B)
C9 1½ NPT (ASME B1.20.1)

For the version with temperature range up to 150 °C/302 °F, the measure of length increases by 28 mm (1.1 in).

For the version with "*Second Line of Defense*", the measure of length increases by 17 mm (0.67 in).

VEGABAR 82, hygienic fitting

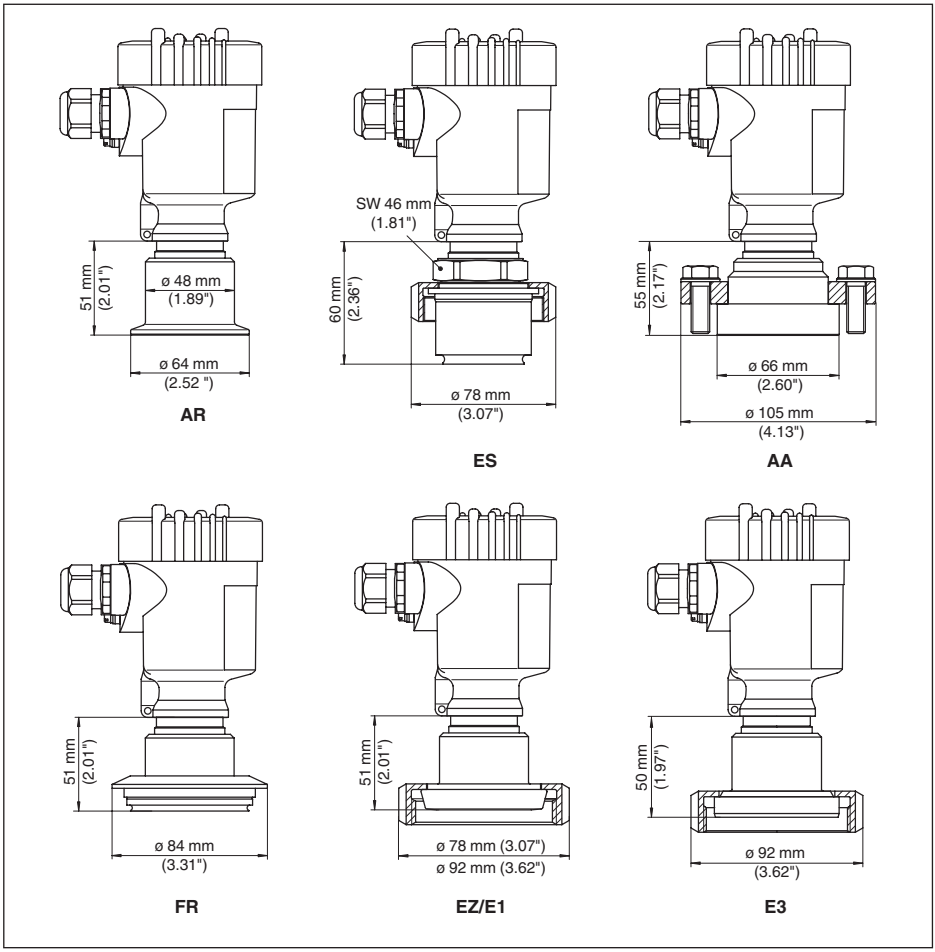


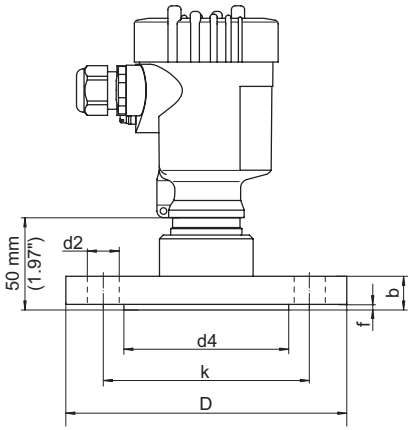
Fig. 52: VEGABAR 82, hygienic fitting

AR Clamp 2"
ES Hygienic fitting with compression nut F40
AA DRD
FR Varivent DN 32
EZ Bolting DN 40 according to DIN 11851
E1 Bolting DN 50 according to DIN 11851
E3 Bolting DN 50 according to DIN 11864-1

For the version with temperature range up to 150 °C/302 °F, the measure of length increases by 28 mm (1.1 in).

For the version with "*Second Line of Defense*", the measure of length increases by 17 mm (0.67 in).

VEGABAR 82, flange connection



	mm	DN	PN	D	b	k	d2	d4	f
①	A8	40	40	150	18	110	4xø18	88	3
	B2	50	40	165	20	125	4xø18	102	3
	R5	80	40	200	24	160	8xø18	138	3
②	CA	2"	150 lbs	152,4	19,1	120,7	4xø19,1	91,9	3,2
	CB	3"	150 lbs	190,5	23,9	152,4	8xø19,1	127	3,2

	inch	DN	PN	D	b	k	d2	d4	f
①	A8	40	40	5.91"	0.71"	4.33"	4xø 0.71"	3.46"	0.12"
	B2	50	40	6.50"	0.79"	4.92"	4xø 0.71"	4.02"	0.12"
	B5	80	40	7.87"	0.95"	6.30"	8xø 0.71"	5.43"	0.12"
②	CA	2"	150 lbs	6"	0.75"	4.75"	4xø 0.75"	3.62"	0.13"
	CB	3"	150 lbs	7.5"	0.94"	6"	8xø 0.75"	5"	0.13"

Fig. 53: VEGABAR 82, flange connection

1 Flange connection according to DIN 2501
2 Flange connection according to ANSI B16.5

For the version with temperature range up to 150 °C/302 °F, the measure of length increases by 28 mm (1.1 in).

For the version with "*Second Line of Defense*", the measure of length increases by 17 mm (0.67 in).

VEGABAR 82, extension fitting

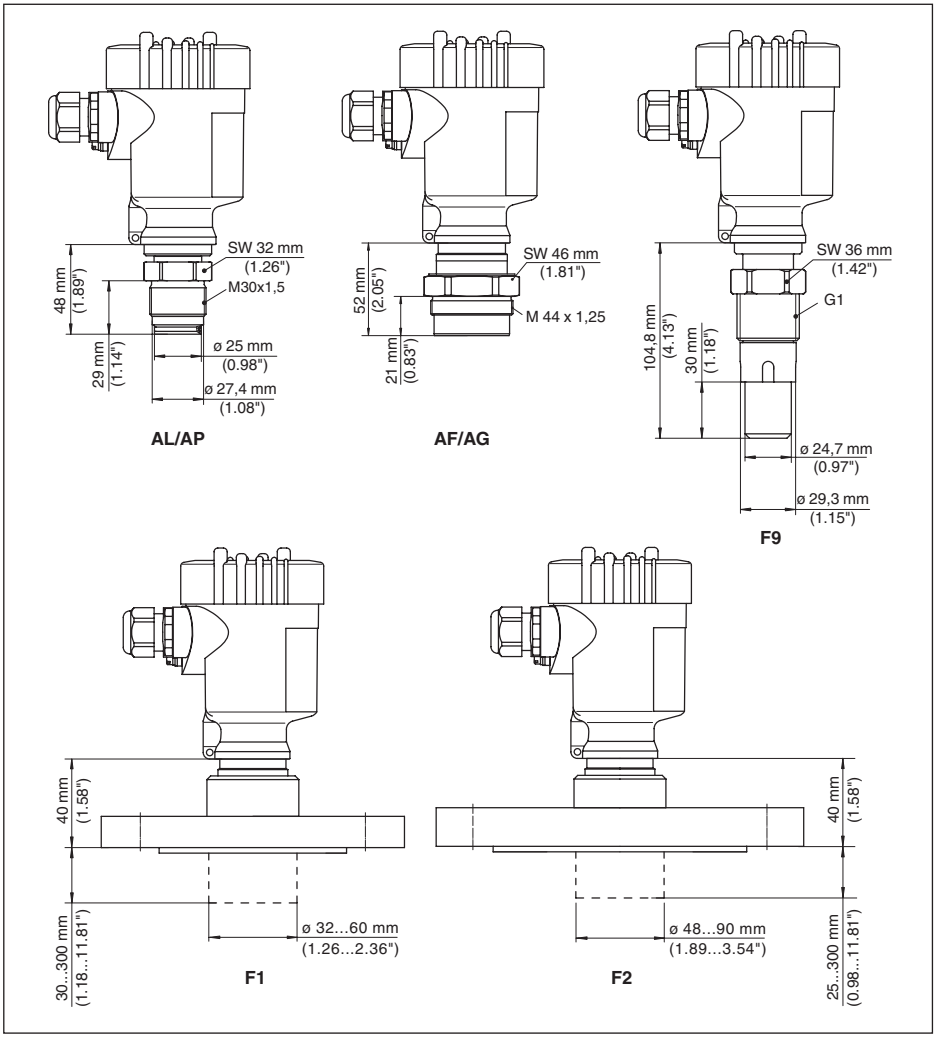


Fig. 54: VEGABAR 82, extension fitting

AL M30 x 1.5
AP M30 x 1.5 for headbox
AF M44 x 1.25 pressure screw Aluminium
AG M44 x 1.25 pressure screw 316L
F9 G1 (ISO 228-1) suitable for PASVE
F1 Flange DN 50 with selectable extension
F2 Flange DN 80 with selectable extension

For the version with temperature range up to 150 °C/302 °F, the measure of length increases by 28 mm (1.1 in).

For the version with "*Second Line of Defense*", the measure of length increases by 17 mm (0.67 in).

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